PROJECT MANUAL
VOLUME 1
BIDDING SET

FOR

New Building
BAR NONE

Project # 1876

October 10, 2019

ARCHITECTS
L&P
ENGINEERS

4675 Royal Drive
Eau Claire, Wisconsin 54710
715-835-7500

Page Intentionally Left Blank

SECTION 00 01 02
TABLE OF CONTENTS

Division	Section Title	Pages

PROCUREMENT AND CONTRACTING DOCUMENTS GROUP

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

00 01 01	Project Title Page	1
00 01 02	Table of Contents	2
00 01 15	List Of Drawing Sheets	1
00 11 16	Invitation to Bid	2
00 21 13	Instructions to Bidders	1
00 22 13	Supplementary Instructions to Bidders	3
00 41 13	Bid Form - Stipulated Sum (single-prime Contract)	2

SPECIFICATIONS GROUP

DIVISION 01 - GENERAL REQUIREMENTS

01 10 00	Summary	2
01 31 00	Project Management and Coordination	6
01 50 00	Temporary Facilities and Controls	3
01 74 19	Construction Waste Management and Disposal	5
01 77 00	Closeout Procedures	4

DIVISION 03 - CONCRETE

03 30 00	Cast-in-place Concrete	5
03 35 43	Polished Concrete Finishing	1

DIVISION 04 - MASONRY

04 43 13.16	Adhered Stone Masonry Veneer	6
04 72 00	Cast Stone Masonry	3

DIVISION 05 - METALS

05 12 00	Structural Steel Framing	4
05 50 00	Metal Fabrications	4
05 51 19	Metal Grating Stairs	7

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

06 10 00	Rough Carpentry	5
06 17 53	Shop-fabricated Wood Trusses	3
06 20 13	Exterior Finish Carpentry	3
06 20 23	Interior Finish Carpentry	2
06 41 16	Plastic-laminate-clad Architectural Cabinets	3

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

07 21 00	Thermal Insulation	2
07 25 00	Weather Barriers	2

07 26 00 Vapor Retarders 2
07 42 93 Soffit Panels 4
07 54 19 Polyvinyl-Chloride (PVC) Roofing 8
07 62 00 Sheet Metal Flashing and Trim 6
07 90 00 Joint Protection 3

DIVISION 08 - OPENINGS
08 11 13 Hollow Metal Doors and Frames 4
08 14 16 Flush Wood Doors 3
08 14 23 Ultimate Commercial Door 4
08 41 13 Aluminum-framed Entrances and Storefronts/Curtainwall 7
08 16 73 Fiberglass Multislide Door 5
08 71 00 Door Hardware 5
08 80 00 Glazing 5

DIVISION 09 - FINISHES
09 24 00 Portland Cement Plaster for Framed Walls 6
09 29 00 Gypsum Board 3
09 30 13 Ceramic Tiling 5
09 51 13 Acoustical Panel Ceilings 3
09 65 13 Resilient Base and Accessories 2
09 91 13 Exterior Painting 4
09 91 23 Interior Painting 4

DIVISION 10 - SPECIALTIES
10 21 13.16 Plastic laminate Clad Toilet Compartments 3
10 28 00 Toilet, Bath, and Laundry Accessories 2
10 30 00 Fireplaces and Stoves 1
10 44 13 Fire Protection Cabinets 2
10 44 16 Fire Extinguishers 2
10 82 13 Roof Screens 7

DIVISION 12 - FURNISHINGS
12 36 61.16 Solid Surface Countertops 3

DIVISION 31 - EARTHWORK
31 10 00 Site Clearing 3
31 20 00 Earth Moving 7

DIVISION 32 - EXTERIOR IMPROVEMENTS
32 12 16 Asphalt Paving 4
32 13 73 Concrete Paving Joint Sealants 3
32 91 13 Soil Preparation 3
32 92 00 Turf And Grasses 4

DIVISION 33 - UTILITIES
33 41 00 Storm Utility Drainage Piping 6

END OF TABLE OF CONTENTS

SECTION 00 01 15
LIST OF DRAWING SHEETS

LIST OF DRAWINGS

Drawings: Drawings consist of the Contract Drawings and other drawings listed on the Table of Contents page of the separately bound drawing set titled BAR NONE, dated October 10, 2019, as modified by subsequent Addenda and Contract modifications.

List of Drawings: Drawings consist of the following Contract Drawings and other drawings of type indicated:

GENERAL
Title Sheet, Index of Drawings, Project maps T100
Code Plans T101

CIVIL
Title Sheet C100
Existing Conditions & Demo Plan C101
Site & Utility Plan C102
Grading Plan C103
Erosion Control Plan C104
Construction Details C500

ARCHITECTURAL
Ground Floor Plan, Partition Types A300
Roof Deck Plan A301
Window Types, Door Types, Frame Types, Schedules A302
Reflected Ceiling Plan A303
Exterior Elevations A400
Exterior Elevations A401
Interior Elevations A402
Interior Elevations A403
Building Sections A501
Building Section, Details A502
Details A503
Window Details A504
Door Details A505
Details A506
Ceiling Details A507

STRUCTURAL
Structural Design Notes S100
Foundation Plan S300
Roof Framing Plan S301
Upper Roof Framing Plan S302
Frame Elevations S303
Frame Elevations, Details S304
Details S305

END OF SECTION

Page Intentionally Left Blank

DOCUMENT 00 11 16
INVITATION TO BID

PROJECT INFORMATION

Notice to Bidders: Prequalified bidders are invited to submit bids for Project as described in this Document according to the Instructions to Bidders.

Project Identification: **BAR NONE**.
Project Location: **Lot 2 Front Porch Place, Altoona, Wisconsin**
Owner's Representative: **Kristin Waldow**
Architect: **Lien & Peterson Architects, Inc.**, **4675 Royal Drive**, **Eau Claire**, **WI 54701.**

Project Description:

In general, the work consists of construction of a new tavern of approximately 4,000 square feet, with adjacent patio, parking improvements, and roof–top terrace. The building is to be fully fire protected.

Construction Contract: Bids will be received for the following Work:
General Contract (all trades).
SINGLE PRIME Contract Project consisting of the following subprime contracts:

General Building Construction.
Mechanical Construction (design/build).
Plumbing Construction (design/build).
Fire Protection (design/build).
Electrical Construction (design/build).

BID SUBMITTAL AND OPENING

Owner will receive sealed bids until the bid time and date at the location indicated below. Owner will consider bids prepared in compliance with the Instructions to Bidders issued by Owner, and delivered as follows:

Bid Date: October 30, 2019.

Bid Time: 2:00 p.m., local time.

Location: Lien and Peterson Architects, 4675 Royal Drive, Eau Claire, WI (or as indicated by Owner)

Bids will be thereafter **privately** opened.

DOCUMENTS

Online Procurement and Contracting Documents: Obtain access after October 10, 2019 by contacting Architect. Online access will be provided at www.lienandpetersonarchitects.com/plans.

TIME OF COMPLETION

Bidders shall begin the Work on receipt of the Notice to Proceed (no later than April 1, 2020) and shall complete the Work within 180 calendar days.

BIDDER'S QUALIFICATIONS

Bidders must be prequalified by Owner.
Bidders must be properly licensed under the laws governing their respective trades and be able to obtain insurance and bonds required for the Work.

INVITED GENERALS BIDDER LIST:

Durand Builders
Scott Rassmusen
SRasmussen@durandbuilders.com
Office: 715-672-5941
Fax: 715-672-8886
Cell: 715-495-4234

Cole Hagness
chagness@durandbuilders.com
Cell: (715) 495-4203

Wieser Brothers
Jeff Wieser
jeffw@wieserbrothers.com
Office: 507-895-8903
Fax: 507-895-8438
Cell: 608-769-4211

Marawood Construction Services, Inc.
Tom Huse
1312 Bob Brown Boulevard
Altoona, WI 54720
715-514-4720

Dan Prust
danp@marawood.com
715-387-1256 Ext: 201

END OF SECTION

DOCUMENT 002113
INSTRUCTIONS TO BIDDERS

INSTRUCTIONS TO BIDDERS

AIA Document A701, "Instructions to Bidders," is hereby incorporated into the Procurement and Contracting Requirements by reference.

~~A copy of AIA Document A701, "Instructions to Bidders," is bound in this Project Manual.~~

END OF SECTION

Page Intentionally Left Blank

DOCUMENT 00 22 13
SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

INSTRUCTIONS TO BIDDERS

Instructions to Bidders for Project consist of the following:

AIA Document A701, "Instructions to Bidders."

The following Supplementary Instructions to Bidders that modify and add to the requirements of the Instructions to Bidders.

SUPPLEMENTARY INSTRUCTIONS TO BIDDERS, GENERAL

The following supplements modify AIA Document A701, "Instructions to Bidders." Where a portion of the Instructions to Bidders is modified or deleted by these Supplementary Instructions to Bidders, unaltered portions of the Instructions to Bidders shall remain in effect.

ARTICLE 2 - BIDDER'S REPRESENTATIONS

Add Section 2.1.3.1:

2.1.3.1 - The Bidder has investigated all required fees, permits, and regulatory requirements of authorities having jurisdiction and has properly included in the submitted bid the cost of such fees, permits, and requirements not otherwise indicated as provided by Owner.

Add Section 2.1.5:

2.1.5 - The Bidder is a properly licensed Contractor according to the laws and regulations of the State of Wisconsin and meets qualifications indicated in the Procurement and Contracting Documents.

Add Section 2.1.6:

2.1.6 - The Bidder has incorporated into the Bid adequate sums for work performed by installers whose qualifications meet those indicated in the Procurement and Contracting Documents.

ARTICLE 3 - BIDDING DOCUMENTS

3.4 - Addenda:

Delete Section 3.4.3 and replace with the following:

3.4.3 - Addenda may be issued at any time prior to the receipt of bids.

Add Section 3.4.4.1:

3.4.4.1 - Owner may elect to waive the requirement for acknowledging receipt of 3.4.4 Addenda as follows:

3.4.4.1.1 - Information received as part of the Bid indicates that the Bid, as submitted, reflects modifications to the Procurement and Contracting Documents included in an unacknowledged Addendum.

3.4.4.1.2 - Modifications to the Procurement and Contracting Documents in an unacknowledged Addendum do not, in the opinion of Owner, affect the Contract Sum or Contract Time.

ARTICLE 4 - BIDDING PROCEDURES

4.1 - Preparation of Bids:

Add Section 4.1.1.1:

4.1.1.1 - Printable electronic Bid Forms and related documents are available from Architect.

Add Section 4.1.8:

4.1.8 - The Bid shall include unit prices when called for by the Procurement and Contracting Documents. Owner may elect to consider unit prices in the determination of award. Unit prices will be incorporated into the Contract.

Add Section 4.1.9:

4.1.9 - Owner may elect to disqualify a bid due to failure to submit a bid in the form requested, failure to bid requested alternates or unit prices, failure to complete entries in all blanks in the Bid

Form, or inclusion by the Bidder of any alternates, conditions, limitations or provisions not called for.

Add Section 4.1.10:

4.1.10 - Bids shall include sales and use taxes. Contractors shall show separately with each monthly payment application the sales and use taxes paid by them and their subcontractors in the form indicated. Reimbursement of sales and use taxes, if any, shall be applied for by Owner for the sole benefit of Owner.

4.3 - Submission of Bids:

Add Section 4.3.1.2:

4.3.1.2 - Include Bidder's Contractor License Number applicable in Project jurisdiction on the face of the sealed bid envelope.

4.4 - Modification or Withdrawal of Bids:

Add the following sections to 4.4.2:

4.4.2.1 - Such modifications to or withdrawal of a bid may only be made by persons authorized to act on behalf of the Bidder. Authorized persons are those so identified in the Bidder's corporate bylaws, specifically empowered by the Bidder's charter or similar legally binding document acceptable to Owner, or by a power of attorney, signed and dated, describing the scope and limitations of the power of attorney. Make such documentation available to Owner at the time of seeking modifications or withdrawal of the Bid.

4.4.2.2 - Owner will consider modifications to a bid written on the sealed bid envelope by authorized persons when such modifications comply with the following: the modification is indicated by a percent or stated amount to be added to or deducted from the Bid; the amount of the Bid itself is not made known by the modification; a signature of the authorized person, along with the time and date of the modification, accompanies the modification. Completion of an unsealed bid form, awaiting final figures from the Bidder, does not require power of attorney due to the evidenced authorization of the Bidder implied by the circumstance of the completion and delivery of the Bid.

4.6 - Subcontractors, Suppliers, and Manufacturers List Bid Supplement:

Add Section 4.6:

4.6 - Provide list of major subcontractors, suppliers, and manufacturers furnishing or installing products no later than two business days following Architect's request. Include those subcontractors, suppliers, and manufacturers providing work totaling three percent or more of the Bid amount. Do not change subcontractors, suppliers, and manufacturers from those submitted without approval of Architect.

ARTICLE 5 - CONSIDERATION OF BIDS

5.2 - Rejection of Bids:

Add Section 5.2.1:

5.2.1 - Owner reserves the right to reject a bid based on Owner's and Architect's evaluation of qualification information submitted following opening of bids. Owner's evaluation of the Bidder's qualifications will include: status of licensure and record of compliance with licensing requirements, record of quality of completed work, record of Project completion and ability to complete, record of financial management including financial resources available to complete Project and record of timely payment of obligations, record of Project site management including compliance with requirements of authorities having jurisdiction, record of and number of current claims and disputes and the status of their resolution, and qualifications of the Bidder's proposed Project staff and proposed subcontractors.

ARTICLE 6 - POSTBID INFORMATION

6.3 - Submittals:

Add Section 6.3.1.4:

6.3.1.4 - Submit information requested in Sections 6.3.1.1, 6.3.1.2, and 6.3.1.3 no later than two business days following Architect's request.

ARTICLE 7 - PERFORMANCE BOND AND PAYMENT BOND

7.1 - Bond Requirements:

Add Section 7.1.1.1:

7.1.1.1 - Both a Performance Bond and a Payment Bond will be required, each in an amount equal to 100 percent of the Contract Sum.

7.2 - Time of Delivery and Form of Bonds:

Delete the first sentence of Section 7.2.1 and insert the following:

The Bidder shall deliver the required bonds to Owner no later than 10 days after the date of Notice of Intent to Award and no later than the date of execution of the Contract, whichever occurs first. Owner may deem the failure of the Bidder to deliver required bonds within the period of time allowed a default.

Delete Section 7.2.3 and insert the following:

7.2.3 - Bonds shall be executed and be in force on the date of the execution of the Contract.

ARTICLE 9 - EXECUTION OF THE CONTRACT

Add Article 9:

9.1.1 - Subsequent to the Notice of Intent to Award, and within 10 days after the prescribed Form of Agreement is presented to the Awardee for signature, the Awardee shall execute and deliver the Agreement to Owner through Architect, in such number of counterparts as Owner may require.

9.1.2 - Owner may deem as a default the failure of the Awardee to execute the Contract and to supply the required bonds when the Agreement is presented for signature within the period of time allowed.

9.1.3 - Unless otherwise indicated in the Procurement and Contracting Documents or the executed Agreement, the date of commencement of the Work shall be the date of the executed Agreement.

9.1.4 - In the event of a default, Owner may declare the amount of the Bid security forfeited and elect to either award the Contract to the next responsible bidder or re-advertise for bids.

END OF SECTION

Page Intentionally Left Blank

SECTION 00 41 13
BID FORM - STIPULATED SUM (SINGLE-PRIME CONTRACT)

BID INFORMATION

Bidder: _____.
Project Name: **BAR NONE, New Building**
Project Location: **Lot 2 Front Porch Place Altoona, WI**
Owner: **Bob's Yer Uncle LLC**
Architect: **Lien & Peterson Architects, Inc.**
Architect Project Number: **1876**.

CERTIFICATIONS AND BASE BID

Base Bid, Single-Prime (All Trades) Contract: The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by Lien & Peterson Architects, Inc. and Architect's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of the above-named project, according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of:

_____ Dollars ($_____).

In the event Owner does not offer Notice of Award within the time limits stated above, Owner will return to the undersigned the cash, cashier's check, certified check, U.S. money order, or bid bond.

SUBCONTRACTORS AND SUPPLIERS

The following companies shall execute subcontracts for the portions of the Work indicated:

Concrete Work: _____.

Masonry Work: _____.

Roofing Work: _____.

Plumbing Work: _____.

HVAC Work: _____.

Electrical Work: _____.

TIME OF COMPLETION

The undersigned Bidder proposes and agrees hereby to commence the Work of the Contract Documents on a date specified in a written Notice to Proceed to be issued by Architect, and shall fully complete the Work no later than _____, 2020 (enter proposed month and day)

ACKNOWLEDGEMENT OF ADDENDA

The undersigned Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:

Addendum No. 1, dated _____.

Addendum No. 2, dated _____.

CONTRACTOR'S LICENSE

The undersigned further states that it is a duly licensed contractor, for the type of work proposed, in the State of Wisconsin, and that all fees, permits, etc., pursuant to submitting this proposal have been paid in full.

SUBMISSION OF BID

Respectfully submitted this _____ day of _____, 2019.

Submitted By _____ (Name of bidding firm or corporation).

Authorized Signature: _____ (Handwritten signature).

Signed By _____ (Type or print name).

Title: _____ (Owner/Partner/President/Vice President).

Witness By: _____ (Handwritten signature).

Attest: _____ (Handwritten signature).

By _____ (Type or print name).

Title: _____ (Corporate Secretary or Assistant Secretary).

Street Address: _____

City, State, Zip: _____

Phone: _____

License No.: _____

Federal ID No.: _____ (Affix Corporate Seal Here).

END OF SECTION

SECTION 01 10 00
SUMMARY

PART 1 - GENERAL

SUMMARY
Section Includes:

Project information.
Work covered by Contract Documents.
Phased construction.
Work under separate contracts.
Access to site.
Coordination with occupants.
Work restrictions.
Specification and Drawing conventions.

Related Requirements:

Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

PROJECT INFORMATION
Project Identification: **BAR NONE, New Building**

Project Location: **Lot 2 Front Porch Place, Altoona Wisconsin**

Owner: **Bob's Yer Uncle LLC**

Owner's Representative: **Kristin Waldow**

Architect**: Lien & Peterson Architects, Inc., Gregory Granlund, Architect (715)835-7500, gregoryg@2dlp.com**.

WORK COVERED BY CONTRACT DOCUMENTS
The Work of Project is defined by the Contract Documents and consists of the following:

In general, the work consists of construction of a new tavern of approximately 4,000 square feet, with adjacent patio, parking improvements, and roof–top terrace. The building is to be fully fire protected.
Type of Contract:

Project will be constructed under a single prime contract.

ACCESS TO SITE
General: Each Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

Use of Site: Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

Driveways, Walkways, and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

COORDINATION WITH OCCUPANTS

Partial Owner Occupancy: Owner will not occupy the premises during the construction period.

WORK RESTRICTIONS

Work Restrictions, General: Comply with restrictions on construction operations.

Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

On-Site Work Hours:

Limit work to normal business working hours, as governed by local ordinances, Monday through Friday, unless otherwise indicated.

Existing Utility Interruptions:

Notify Architect, Owner not less than two days in advance of proposed utility interruptions.

Restricted Substances: Use of tobacco products and other controlled substances within the existing building on Project site is not permitted.

SPECIFICATION AND DRAWING CONVENTIONS

Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

Specification requirements are to be performed by Contractor unless specifically stated otherwise.

Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

RELATED DOCUMENTS
Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

SUMMARY
Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

- General coordination procedures.
- Coordination drawings.
- RFIs.
- Digital project management procedures.
- Project meetings.

DEFINITIONS
BIM: Building Information Modeling.

RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

INFORMATIONAL SUBMITTALS
Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

- Name, address, telephone number, and email address of entity performing subcontract or supplying products.
- Number and title of related Specification Section(s) covered by subcontract.
- Drawing number and detail references, as appropriate, covered by subcontract.

GENERAL COORDINATION PROCEDURES
Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

- Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
- Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
- Make adequate provisions to accommodate items scheduled for later installation.

Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and scheduled activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

- Preparation of Contractor's construction schedule.
- Preparation of the schedule of values.
- Installation and removal of temporary facilities and controls.
- Delivery and processing of submittals.

Progress meetings.
Preinstallation conferences.
Project closeout activities.
Startup and adjustment of systems.

COORDINATION DRAWINGS

Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

Coordination Drawing Organization: Organize coordination drawings as follows:

Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
Structural Penetrations: Indicate penetrations and openings required for all disciplines.
Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility.

REQUEST FOR INFORMATION (RFI)

General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

Project name.
Project number.
Date.
Name of Contractor.
Name of Architect.
RFI number, numbered sequentially.
RFI subject.

Specification Section number and title and related paragraphs, as appropriate.
Drawing number and detail references, as appropriate.
Field dimensions and conditions, as appropriate.
Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
Contractor's signature.
Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

RFI Forms: Form bound in Project Manual.

Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

The following Contractor-generated RFIs will be returned without action:

Requests for approval of submittals.
Requests for approval of substitutions.
Requests for approval of Contractor's means and methods.
Requests for coordination information already indicated in the Contract Documents.
Requests for adjustments in the Contract Time or the Contract Sum.
Requests for interpretation of Architect's actions on submittals.
Incomplete RFIs or inaccurately prepared RFIs.

Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architectof additional information.

PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:

Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
Name file with submittal number or other unique identifier, including revision identifier.
Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

PROJECT MEETINGS

General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect.

Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
Agenda: Discuss items of significance that could affect progress, including the following:

Responsibilities and personnel assignments.
Tentative construction schedule.
Critical work sequencing and long lead items.
Designation of key personnel and their duties.
Lines of communications.
Procedures for processing field decisions and Change Orders.
Procedures for RFIs.

Procedures for testing and inspecting.
Procedures for processing Applications for Payment.
Distribution of the Contract Documents.
Submittal procedures.
Use of the premises and existing building.
Work restrictions.
Working hours.
Owner's occupancy requirements.
Responsibility for temporary facilities and controls.
Procedures for moisture and mold control.
Procedures for disruptions and shutdowns.
Construction waste management and recycling.
Parking availability.
Office, work, and storage areas.
Equipment deliveries and priorities.
First aid.
Security.
Progress cleaning.

Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.

Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, and Owner's Commissioning Authority of scheduled meeting dates.

Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

Contract Documents.
Options.
Related RFIs.
Related Change Orders.
Purchases.
Deliveries.
Submittals.
Sustainable design requirements.
Review of mockups.
Possible conflicts.
Compatibility requirements.
Time schedules.
Weather limitations.
Manufacturer's written instructions.
Warranty requirements.
Compatibility of materials.
Acceptability of substrates.
Temporary facilities and controls.
Space and access limitations.
Regulations of authorities having jurisdiction.
Testing and inspecting requirements.
Installation procedures.
Coordination with other work.
Required performance results.
Protection of adjacent work.

Protection of construction and personnel.

Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

Progress Meetings: Conduct progress meetings at regular intervals.

Coordinate dates of meetings with preparation of payment requests.

Attendees: In addition to representatives of Owner, Owner's Commissioning Authority and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

Review schedule for next period.

Review present and future needs of each entity present, including the following:

Interface requirements.
Sequence of operations.
Status of submittals.
Status of sustainable design documentation.
Deliveries.
Off-site fabrication.
Access.
Site use.
Temporary facilities and controls.
Progress cleaning.
Quality and work standards.
Status of correction of deficient items.
Field observations.
Status of RFIs.
Status of Proposal Requests.
Pending changes.
Status of Change Orders.
Pending claims and disputes.
Documentation of information for payment requests.

Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

SUMMARY
Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

Related Requirements:

Section 01 10 00 "Summary" for work restrictions and limitations on utility interruptions.

USE CHARGES
General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

Water and Sewer Service from Existing System: Provide connections and extensions of services as required for construction operations, coordinate installation of temporary and new metering.

Electric Power Service from Existing System: Provide connections and extensions of services as required for construction operations, coordinate installation of temporary and new metering.

INFORMATIONAL SUBMITTALS
Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

Moisture-and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.

QUALITY ASSURANCE
Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

PROJECT CONDITIONS
Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

TEMPORARY FACILITIES
Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

EQUIPMENT
Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

TEMPORARY FACILITIES, GENERAL
Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

INSTALLATION, GENERAL
Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

TEMPORARY UTILITY INSTALLATION
General: Install temporary service or connect to existing service.

Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

SECURITY AND PROTECTION FACILITIES INSTALLATION
Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.

Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.

Maintain security by limiting number of keys and restricting distribution to authorized personnel.

OPERATION, TERMINATION, AND REMOVAL

Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

Maintenance: Maintain facilities in good operating condition until removal.

Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.

At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION

Page Intentionally Left Blank

SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

SUMMARY

Section includes administrative and procedural requirements for the following:

Salvaging nonhazardous construction waste.
Recycling nonhazardous construction waste.
Disposing of nonhazardous construction waste.

DEFINITIONS

Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

PERFORMANCE REQUIREMENTS

General: Achieve end-of-Project rates for salvage/recycling of 50 percent by weight of total non-hazardous solid waste generated by the Work. Facilitate recycling and salvage of materials.

ACTION SUBMITTALS

Waste Management Plan: Submit plan within 7 days of date established for commencement of the Work.

INFORMATIONAL SUBMITTALS

Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:

Material category.
Generation point of waste.
Total quantity of waste in tons.
Quantity of waste salvaged, both estimated and actual in tons.
Quantity of waste recycled, both estimated and actual in tons.
Total quantity of waste recovered (salvaged plus recycled) in tons.
Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

Qualification Data: For waste management coordinator.

QUALITY ASSURANCE

Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements.

Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination."

WASTE MANAGEMENT PLAN

General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

Waste Identification: Indicate anticipated types and quantities of demolition and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.

Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.

Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.

Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.

Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.

Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

PLAN IMPLEMENTATION

General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.

Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

Distribute waste management plan to everyone concerned within three days of submittal return.
Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
Comply with Section 01 50 00 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

SALVAGING DEMOLITION WASTE
Salvaged Items for Reuse in the Work:

Clean salvaged items.
Pack or crate items after cleaning. Identify contents of containers.
Store items in a secure area until installation.
Protect items from damage during transport and storage.
Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

Salvaged Items for Sale and Donation: Not permitted on Project site.

Salvaged Items for Owner's Use:

Clean salvaged items.
Pack or crate items after cleaning. Identify contents of containers.
Store items in a secure area until delivery to Owner.
Transport items to Owner's storage area designated by Owner.
Protect items from damage during transport and storage.

RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL
General: Recycle paper and beverage containers used by on-site workers.

Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

- Inspect containers and bins for contamination and remove contaminated materials if found.

Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
Stockpile materials away from construction area. Do not store within drip line of remaining trees.
Store components off the ground and protect from the weather.

Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

RECYCLING DEMOLITION WASTE

Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

Pulverize concrete to maximum 1-1/2-inch size.

Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.

Pulverize masonry to maximum 1-inch size.

Clean and stack undamaged, whole masonry units on wood pallets.

Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

Metals: Separate metals by type.

Structural Steel: Stack members according to size, type of member, and length.

Remove and dispose of bolts, nuts, washers, and other rough hardware.

Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

Conduit: Reduce conduit to straight lengths and store by type and size.

RECYCLING CONSTRUCTION WASTE

Packaging:

Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.

Polystyrene Packaging: Separate and bag materials.

Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.

Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

Wood Materials:

Clean Cut-Offs of Lumber: Grind or chip into small pieces.

Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

DISPOSAL OF WASTE

General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.

Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

Burning: Do not burn waste materials.

Burning: Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

Disposal: Remove waste materials and dispose of at designated spoil areas on Owner's property.

Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION

Page Intentionally Left Blank

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 - GENERAL

SUMMARY
Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

Substantial Completion procedures.
Final completion procedures.
Warranties.
Final cleaning.
Repair of the Work.

ACTION SUBMITTALS
Product Data: For each type of cleaning agent.

Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

Certified List of Incomplete Items: Final submittal at final completion.

CLOSEOUT SUBMITTALS
Certificates of Release: From authorities having jurisdiction.

Certificate of Insurance: For continuing coverage.

Field Report: For pest control inspection.

SUBSTANTIAL COMPLETION PROCEDURES
Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
Submit testing, adjusting, and balancing records.
Submit sustainable design submittals not previously submitted.
Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

- Advise Owner of pending insurance changeover requirements.
- Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
- Complete startup and testing of systems and equipment.
- Perform preventive maintenance on equipment used prior to Substantial Completion.
- Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training."
- Advise Owner of changeover in utility services.
- Participate with Owner in conducting inspection and walkthrough with local emergency responders.
- Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
- Complete final cleaning requirements.
- Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

FINAL COMPLETION PROCEDURES

Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

- Submit a final Application for Payment according to Section 01 29 00 "Payment Procedures."
- Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
- Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- Submit pest-control final inspection report.

Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

LIST OF INCOMPLETE ITEMS (PUNCH LIST)

Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

- Organize list of spaces in sequential order, starting with exterior areas first.
- Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
- Submit list of incomplete items in the following format:

    - PDF electronic file. Architect will return annotated file.

SUBMITTAL OF PROJECT WARRANTIES

Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

Submit on digital media acceptable to Architect.

Warranties in Paper Form:

Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.

Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

MATERIALS

Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

FINAL CLEANING

General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

Sweep concrete floors broom clean in unoccupied spaces.

Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.

Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.

Leave Project clean and ready for occupancy.

Pest Control: Comply with pest control requirements in Section 01 50 00 "Temporary Facilities and Controls." Prepare written report.

Construction Waste Disposal: Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."

REPAIR OF THE WORK

Complete repair and restoration operations, before requesting inspection for determination of Substantial Completion.

Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

SUMMARY
Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes. See Section 03 35 43 Polished Concrete Finishing.

ACTION SUBMITTALS
Product Data: For each type of product.
Design Mixtures: For each concrete mixture.
Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement.

INFORMATIONAL SUBMITTALS
Material certificates.

Material test reports.

Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer, detailing fabrication, assembly, and support of formwork.

Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

QUALITY ASSURANCE
Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

FIELD CONDITIONS
Cold-Weather Placement: Comply with ACI 306.1.

Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

Hot-Weather Placement: Comply with ACI 301.

PART 2 - PRODUCTS

CONCRETE, GENERAL
ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
ACI 301.
ACI 117.

FORM-FACING MATERIALS
Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

STEEL REINFORCEMENT

Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

CONCRETE MATERIALS

Cementitious Materials:

Portland Cement: ASTM C 150/C 150M, Type I,.
Fly Ash: ASTM C 618, Class F.
Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
Blended Hydraulic Cement: ASTM C 595/C 595M, Type IS, portland blast-furnace slag cement.

Normal-Weight Aggregates: ASTM C 33/C 33M, graded.

Maximum Coarse-Aggregate Size: 3/4 inch nominal.
Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

Lightweight Aggregate: ASTM C 330/C 330M, 1/2-inch nominal maximum aggregate size.

Air-Entraining Admixture: ASTM C 260/C 260M.

Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
Retarding Admixture: ASTM C 494/C 494M, Type B.
Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

Water: ASTM C 94/C 94M.

VAPOR RETARDERS

Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils thick.

CURING MATERIALS

Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

Water: Potable.

Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

RELATED MATERIALS
Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

CONCRETE MIXTURES, GENERAL
Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

Cementitious Materials: Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.

Admixtures: Use admixtures according to manufacturer's written instructions.

Use water-reducing admixture in concrete, as required, for placement and workability.
Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.

CONCRETE MIXTURES FOR BUILDING ELEMENTS
Normal-Weight Concrete:

Minimum Compressive Strength: 4000 psi at 28 days.
Maximum W/C Ratio: 0.50.
Slump Limit: 5 inches, plus or minus 1 inch.
Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.

FABRICATING REINFORCEMENT
Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

CONCRETE MIXING
Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.

When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

FORMWORK INSTALLATION
Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

Do not chamfer exterior corners and edges of permanently exposed concrete.

EMBEDDED ITEM INSTALLATION
Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

VAPOR-RETARDER INSTALLATION

Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

Lap joints 6 inches and seal with manufacturer's recommended tape.

STEEL REINFORCEMENT INSTALLATION

General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

JOINTS

General: Construct joints true to line with faces perpendicular to surface plane of concrete.

Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.

Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

CONCRETE PLACEMENT

Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

FINISHING FLOORS AND SLABS

General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

Apply a trowel finish to surfaces exposed to view.

Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

See Section 03 35 43 Polished Concrete Finishing.

CONCRETE PROTECTING AND CURING

General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305.1 for hot-weather protection during curing.

Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.

Cure concrete according to ACI 308.1, by one or a combination of the following methods:

Moisture Curing: Keep surfaces continuously moist for not less than seven days.

Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.

Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

CONCRETE SURFACE REPAIRS

Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

END OF SECTION

Page Intentionally Left Blank

SECTION 03 35 43
POLISHED CONCRETE FINISHING

PART 1 - GENERAL

SUMMARY
Section includes polished concrete finishing.

ACTION SUBMITTALS
Product Data: For each type of product.
Samples: For each type of product requiring color selection.

QUALITY ASSURANCE
Field Sample Panels: After approval of samples, produce field sample panels to demonstrate the approved range of selections made under Sample submittals. Produce a minimum of three sets of full-scale panels, approximately 48 by 48 inches minimum, to demonstrate the expected range of finish, color, and appearance variations.

- Locate panels as indicated or, if not indicated, as directed by Architect.
- Maintain field sample panels during construction in an undisturbed condition as a standard for judging the completed Work.
- Demolish and remove field sample panels when directed.

PART 2 - PRODUCTS

LIQUID FLOOR TREATMENTS
Penetrating Liquid Floor Treatments for Polished Concrete Finish: Clear, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and is suitable for polished concrete surfaces.

PART 3 - EXECUTION

POLISHING
Polish: Level 2: Low sheen, 400 grit.

Apply polished concrete finish system to cured and prepared slabs.

- Machine grind floor surfaces to receive polished finishes level and smooth.
- Apply penetrating liquid floor treatment for polished concrete in polishing sequence and according to manufacturer's written instructions, allowing recommended drying time between successive coats.
- Continue polishing with progressively finer-grit diamond polishing pads to gloss level, to match approved mockup.
- Control and dispose of waste products produced by grinding and polishing operations.
- Neutralize and clean polished floor surfaces.

END OF SECTION

Page Intentionally Left Blank

SECTION 04 43 13.16
ADHERED STONE MASONRY VENEER

PART 1 - GENERAL

SUMMARY
Section Includes:
Stone masonry adhered to wood framing and sheathing.

ACTION SUBMITTALS
Product Data: For each variety of stone, stone accessory, and manufactured product.

Samples:
For each stone type indicated.
For each color of mortar required.

FIELD CONDITIONS
Protection of Stone Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work.

Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried.

Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

Manufactured STONE
Material Standards:

Maximum Absorption according to ASTM C 97/C 97M: 7.5 percent.
Minimum Compressive Strength according to ASTM C 170/C 170M: 4000 psi.

Varieties and Sources: Subject to compliance with requirements, available stone varieties that may be incorporated into the Work include, but are not limited to, the following:

<**Eldorado stone or equivalent**>.

MORTAR MATERIALS
Portland Cement: ASTM C 150/C 150M, Type I or Type II, except Type III may be used for cold-weather construction; natural color or white cement may be used as required to produce mortar color indicated.

Low-Alkali Cement: Not more than 0.60 percent total alkali when tested according to ASTM C 114.

Hydrated Lime: ASTM C 207, Type S.

Masonry Cement: ASTM C 91/C 91M.

Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979/C 979M. Use only pigments with a record of satisfactory performance in stone masonry mortar.

Colored Portland Cement-Lime Mix: Packaged blend of portland cement, hydrated lime, and mortar pigments. Mix shall produce color indicated or, if not indicated, as selected from manufacturer's standard colors. Pigments shall not exceed 10 percent of portland cement by weight.

Colored Masonry Cement Mix: Packaged blend of masonry cement and mortar pigments. Mix shall produce color indicated or, if not indicated, as selected from manufacturer's standard colors. Pigments shall not exceed 5 percent of masonry cement by weight.

Aggregate: ASTM C 144 and as follows:

For pointing mortar, use aggregate graded with 100 percent passing No. 16 sieve.
White Aggregates: Natural white sand or ground white stone.
Colored Aggregates: Natural-colored sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.

Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement mortar bed, and not containing a retarder.

Water: Potable.

EMBEDDED FLASHING MATERIALS

Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

Stainless Steel: ASTM A 240/A 240M, Type 304, 0.016 inch thick.
Copper: ASTM B 370, Temper H00 or H01, cold-rolled copper sheet, 10-oz./sq. ft. weight or 0.0135 inch thick for fully concealed flashing; 16-oz./sq. ft. weight or 0.0216 inch thick elsewhere.

Flexible Flashing: For flashing unexposed to the exterior, use the following unless otherwise indicated:

Copper-Laminated Flashing: [**5-oz./sq. ft.**] [**7-oz./sq. ft.**] copper sheet bonded with asphalt between two layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.

MISCELLANEOUS MASONRY ACCESSORIES

Cementitious Dampproofing: Cementitious formulation recommended by ILI and nonstaining to stone, compatible with joint sealants, and noncorrosive to veneer anchors and attachments.

Weep Products: Use one of the following unless otherwise indicated:

Wicking Material: Absorbent rope, made from UV-resistant synthetic fiber, 1/4 to 3/8 inch in diameter.
Mesh Weep Holes: Free-draining mesh; made from polyethylene strands, full width of head joint and 2 inches high by thickness of stone masonry; in color selected from manufacturer's standard.

Expanded Metal Lath: 3.4 lb/sq. yd., self-furring, diamond-mesh lath complying with ASTM C 847. Fabricate from structural-quality, zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G60.

Welded-Wire Lath: ASTM C 933, fabricated into 2-by-2-inch mesh with minimum 0.0625-inch-diameter, galvanized-steel wire.

MASONRY CLEANERS

Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar and grout stains, efflorescence, and other new construction stains from stone masonry surfaces without discoloring or damaging masonry surfaces; expressly approved for intended use by cleaner manufacturer and stone producer.

FABRICATION

Cut stone to produce pieces of thickness, size, and shape indicated, including details on Drawings and pattern specified in "Setting Stone Masonry" Article.

Shape stone specified to be laid in three-course, random range ashlar pattern with sawed beds.

Gage backs of stones for adhered veneer if more than 81 sq. in. in area.

Thickness of Stone: Provide thickness indicated, but not less than the following:

Thickness: 1 inch plus or minus 1/4 inch.

Finish exposed stone faces and edges to comply with requirements indicated for finish and to match approved samples.

Finish: Mixed split face and seam face.
Finish for Sills: Smooth.

MORTAR MIXES

General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

Do not use calcium chloride.
Use portland cement-lime or masonry cement mortar unless otherwise indicated.
Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding water. Then mix again, adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for one to two hours. Add remaining water in small portions until mortar reaches required consistency. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.

Mortar for Stone Masonry: Comply with ASTM C 270, Proportion Specification.

Mortar for Setting Stone: Type N.
Mortar for Pointing Stone: Type N.

Latex-Modified Portland Cement Setting Mortar: Proportion and mix portland cement, aggregate, and latex additive to comply with latex-additive manufacturer's written instructions.

Cement-Paste Bond Coat: Mix either neat cement and water or cement, sand, and water to a consistency similar to that of thick cream.

For latex-modified portland cement, setting-bed mortar, substitute latex admixture for part or all of water, according to latex-additive manufacturer's written instructions.

Mortar for Scratch Coat over Metal Lath: 1 part portland cement, 1/2 part lime, 5 parts loose damp sand, and enough water to produce a workable consistency.

Mortar for Scratch Coat over Unit Masonry: 1 part portland cement, 1 part lime, 7 parts loose damp sand, and enough water to produce a workable consistency.

Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

Pigments shall not exceed 10 percent of portland cement by weight.

Pigments shall not exceed 5 percent of masonry cement by weight.

PART 3 - EXECUTION

SETTING STONE MASONRY

Perform necessary field cutting and trimming as stone is set.

Use power saws to cut stone that is fabricated with saw-cut surfaces. Cut lines straight and true, with edges eased slightly to prevent snipping.

Use hammer and chisel to split stone that is fabricated with split surfaces. Make edges straight and true, matching similar surfaces that were shop or quarry fabricated.

Pitch face at field-split edges as needed to match stones that are not field split.

Sort stone before it is placed in wall to remove stone that does not comply with requirements relating to aesthetic effects, physical properties, or fabrication, or that is otherwise unsuitable for intended use.

Arrange stones in range ashlar pattern with course heights as indicated, random lengths, and uniform joint widths, with offset between vertical joints as indicated.

Arrange stones in broken-range ashlar pattern with uniform course heights, random lengths, and uniform joint widths.

Arrange stones in three-course, random-range ashlar pattern with random course heights, random lengths (interrupted coursed), and uniform joint widths.

Arrange stones in polygonal (mosaic) pattern with uniform joint widths.

Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.

Maintain uniform joint widths, except for variations due to different stone sizes and where minor variations are required to maintain bond alignment if any. Lay walls with joints not less than 3/8 inch at narrowest points or more than 1/2 inch at widest points.

Provide sealant joints of widths and at locations indicated.

Keep sealant joints free of mortar and other rigid materials.

Sealant joints are specified in Section 07 92 00 "Joint Sealants."

Install embedded flashing and weep holes at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

At stud-framed walls, extend flashing through stone masonry, up sheathing face at least 8 inches, and behind weather barrier.

At lintels and shelf angles, extend flashing full length of angles but not less than 6 inches into masonry at each end.

At sills, extend flashing not less than 4 inches at ends.

At ends of head and sill flashing, turn up not less than 2 inches to form end dams.

Extend sheet metal flashing 1/2 inch beyond masonry face at exterior, and turn flashing down to form a drip.

Install metal drip edges beneath flexible flashing at exterior wall face. Stop flexible flashing 1/2 inch back from exterior wall face, and adhere flexible flashing to top of metal drip edge.

Install metal flashing termination beneath flexible flashing at exterior wall face. Stop flexible flashing 1/2 inch back from exterior wall face, and adhere flexible flashing to top of metal flashing termination.

Cut flexible flashing flush with wall face after completing masonry wall construction.

Coat limestone with cementitious dampproofing as follows:

Stone at Grade: Beds, joints, and back surfaces to at least 12 inches above finish-grade elevations.

Stone Extending below Grade: Beds, joints, back surfaces, and face surfaces below grade.

Place weep holes in joints where moisture may accumulate, including above shelf angles and at flashing.

Use wicking material mesh weep holes or open head joints to form weep holes.

Use wicking material to form weep holes above flashing in stone sills. Turn wicking down at lip of sill to be as inconspicuous as possible.

Space weep holes 16 inches o.c.

Trim wicking material used in weep holes flush with exterior wall face after mortar has set.

CONSTRUCTION TOLERANCES

Variation from Plumb: For vertical lines and surfaces, do not exceed 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch in 40 feet or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.

Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.

Variation of Linear Building Line: For position shown in plan, do not exceed 1/2 inch in 20 feet or 3/4 inch in 40 feet or more.

INSTALLATION OF ADHERED STONE MASONRY VENEER

Install flashing over sheathing and behind building paper or wrap and drainage material by fastening through sheathing into framing.

Install lath over building paper or wrap and drainage material by fastening through sheathing into framing to comply with ASTM C 1063.

Install lath over unit masonry and concrete to comply with ASTM C 1063.

Install scratch coat over metal lath 3/8 inch thick to comply with ASTM C 926.

Coat backs of stone units and face of scratch coat with cement-paste bond coat, then butter both surfaces with setting mortar. Use sufficient setting mortar, so a slight excess will be forced out the edges of stone units as they are set. Tap units into place, completely filling space between units and scratch coat.

Rake out joints for pointing with mortar to depth of not less than 1/2 inch before setting mortar has hardened. Rake joints to uniform depths with square bottoms and clean sides.

POINTING

Prepare stone-joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply pointing mortar in layers not more than 3/8 inch deep until a uniform depth is formed.

Point stone joints by placing and compacting pointing mortar in layers of not more than 3/8 inch deep. Compact each layer thoroughly, and allow to it become thumbprint hard before applying next layer.

Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce the following joint profile:

Joint Profile: Smooth, flat face slightly below edges of stone.

ADJUSTING AND CLEANING

In-Progress Cleaning: Clean stone masonry as work progresses. Remove mortar fins and smears before tooling joints.

Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry as follows:

Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before cleaning stone masonry.

Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.

Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.

Clean stone masonry by bucket and brush hand-cleaning method described in BIA Technical Note No. 20, Revised II, using job-mixed detergent solution.

Clean stone masonry with proprietary acidic cleaner applied according to manufacturer's written instructions.

Clean limestone masonry to comply with recommendations in ILI's "Indiana Limestone Handbook."

EXCESS MATERIALS AND WASTE

Excess Stone: Stack excess stone where directed by Owner for Owner's use.

Disposal as Fill Material: Dispose of clean masonry waste, including mortar and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed.

Do not dispose of masonry waste as fill within 18 inches of finished grade.

END OF SECTION

SECTION 04 72 00
CAST STONE MASONRY

PART 1 - GENERAL

SUMMARY
Section Includes:
Cast-stone sill.

ACTION SUBMITTALS
Product Data: For each type of product.

For cast-stone units, include dimensions and finishes.

Shop Drawings: Show fabrication and installation details for cast-stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.

Samples:
For each color and texture of cast stone required.
For colored mortar.

INFORMATIONAL SUBMITTALS
Qualification Data: For manufacturer.

Material Test Reports: For each mix required to produce cast stone, based on testing according to ASTM C 1364, including test for resistance to freezing and thawing.

QUALITY ASSURANCE
Manufacturer Qualifications: A qualified manufacturer of cast-stone units similar to those indicated for this Project, which has sufficient production capacity to manufacture required units, and is a plant certified by the Cast Stone Institute, the Architectural Precast Association, or the Precast/Prestressed Concrete Institute for Group A, Category AT.

PART 2 - PRODUCTS

CAST-STONE UNITS
Cast-Stone Units: Comply with ASTM C 1364.

Units shall be resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666/C 666M, Procedure A, as modified by ASTM C 1364.

Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.

Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.
Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
Provide drips on projecting elements unless otherwise indicated.

Cure Units as Follows:

Cure units in enclosed, moist curing room at 95 to 100 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.

Acid etch units after curing to remove cement film from surfaces to be exposed to view.

Colors and Textures: As selected by Architect from manufacturer's full range.

ACCESSORIES

Anchors: Type and size indicated, fabricated from steel complying with ASTM A 36/A 36M and hot-dip galvanized to comply with ASTM A 123/A 123M.

Dowels: 1/2-inch-diameter round bars, fabricated from steel complying with ASTM A 36/A 36M and hot-dip galvanized to comply with ASTM A 123/A 123M.

Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cast-stone manufacturer and expressly approved by cleaner manufacturer for use on cast stone and adjacent masonry materials.

MORTAR

Comply with requirements in Section 04 26 13 "Masonry Veneer" for mortar mixes.

For setting mortar, use Type N.
For pointing mortar, use Type N.

Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

SOURCE QUALITY CONTROL

Engage a qualified independent testing agency to sample and test cast-stone units according to ASTM C 1364.

Include one test for resistance to freezing and thawing.

PART 3 - EXECUTION

SETTING CAST STONE IN MORTAR

Install cast-stone units to comply with requirements in Section 04 26 13 "Masonry Veneer."

Set units in full bed of mortar with full head joints unless otherwise indicated.

Fill dowel holes and anchor slots with mortar.
Fill collar joints solid as units are set.
Build concealed flashing into mortar joints as units are set.
Keep head joints in copings and between other units with exposed horizontal surfaces open to receive sealant.
Keep joints at shelf angles open to receive sealant.

Rake out joints for pointing with mortar to depths of not less than 3/4 inch. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.

Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

Tool exposed joints slightly concave when thumbprint hard. Use a smooth plastic jointer larger than joint thickness.

Rake out joints for pointing with sealant to depths of not less than 3/4 inch. Scrub faces of units to remove excess mortar as joints are raked.

Provide sealant joints at head joints of copings and other horizontal surfaces; at expansion, control, and pressure-relieving joints; and at locations indicated.

Keep joints free of mortar and other rigid materials.

Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Section 07 92 00 "Joint Sealants."

INSTALLATION TOLERANCES

Variation from Plumb: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

Variation from Level: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches or one-fourth of nominal joint width, whichever is less.

Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch, except where variation is due to warpage of units within tolerances specified.

ADJUSTING AND CLEANING

Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.

Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.

In-Progress Cleaning: Clean cast stone as work progresses.

Remove mortar fins and smears before tooling joints.

Remove excess sealant immediately, including spills, smears, and spatter.

Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:

Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of cast stone.

Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.

Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.

Clean cast stone by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.

Clean cast stone with proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION

Page Intentionally Left Blank

SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

SUMMARY
Section Includes:
- Structural steel.
- Grout.

DEFINITIONS
Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

PREINSTALLATION MEETINGS
Preinstallation Conference: Conduct conference at Project site.

ACTION SUBMITTALS
Product Data: For each type of product.
Shop Drawings: Show fabrication of structural-steel components.

INFORMATIONAL SUBMITTALS
Qualification Data: For fabricator.
Welding certificates.
Mill test reports for structural steel, including chemical and physical properties.
Source quality-control reports.
Field quality-control reports.

QUALITY ASSURANCE
Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD, or is accredited by the IAS Fabricator Inspection Program for Structural Steel (AC 172).

Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.

Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

Comply with applicable provisions of the following specifications and documents:

- AISC 303.
- AISC 360.
- RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand loads indicated and comply with other information and restrictions indicated.

- Select and complete connections using schematic details indicated and AISC 360.
- Use Allowable Stress Design; data are given at service-load level.

Moment Connections: Type FR, fully restrained.

Construction: Moment frame.

STRUCTURAL-STEEL MATERIALS

W-Shapes: ASTM A 992/A 992M.

Channels, Angles-Shapes: ASTM A 36/A 36M.

Plate and Bar: ASTM A 36/A 36M.

Cold-Formed Hollow Structural Sections: ASTM A 500/A 500M, Grade B, structural tubing.

Steel Pipe: ASTM A 53/A 53M, Type E or Type S, Grade B.

Welding Electrodes: Comply with AWS requirements.

BOLTS, CONNECTORS, AND ANCHORS

High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.

Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with plain finish.

PRIMER

Primer: Comply with Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting."

GROUT

Metallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.

Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

FABRICATION

Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.

Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

SHOP CONNECTIONS

High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

Joint Type: Snug tightened.

Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

SHOP PRIMING

Shop prime steel surfaces except the following:

Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
Surfaces to be field welded.
Surfaces of high-strength bolted, slip-critical connections.
Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
Galvanized surfaces.
Surfaces enclosed in interior construction.

Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

SSPC-SP 2, "Hand Tool Cleaning."
SSPC-SP 3, "Power Tool Cleaning."
SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."

Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

SOURCE QUALITY CONTROL
Testing Agency: Engage a qualified testing agency to perform shop tests and inspections.

Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

Bolted Connections: Inspect shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

Prepare test and inspection reports.

PART 3 - EXECUTION

EXAMINATION
Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

Proceed with installation only after unsatisfactory conditions have been corrected.

ERECTION
Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

Baseplates Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

Set plates for structural members on wedges, shims, or setting nuts as required.
Weld plate washers to top of baseplate.
Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

FIELD CONNECTIONS

High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

Joint Type: Snug tightened.

Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.

Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

FIELD QUALITY CONTROL

Special Inspections: Engage a qualified special inspector to perform the following special inspections:

Verify structural-steel materials and inspect steel frame joint details.

Verify weld materials and inspect welds.

Verify connection materials and inspect high-strength bolted connections.

Testing Agency: Engage a qualified testing agency to perform tests and inspections.

Bolted Connections: Inspect bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.

In addition to visual inspection, test and inspect field welds according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

Liquid Penetrant Inspection: ASTM E 165.

Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.

Ultrasonic Inspection: ASTM E 164.

Radiographic Inspection: ASTM E 94.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 - GENERAL

SUMMARY
Section Includes:
Miscellaneous steel framing and supports.
Miscellaneous steel trim.
Loose bearing and leveling plates.

Products furnished, but not installed, under this Section include the following:
Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

ACTION SUBMITTALS
Product Data: For the following:
Paint products.
Grout.

Shop Drawings: Show fabrication and installation details.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

METALS
Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

Stainless-Steel Bars and Shapes: ASTM A 276, Type 304 or Type 316L.

Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.

Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.

Size of Channels: As indicated.
Material: Galvanized steel, ASTM A 653/A 653M, structural steel, Grade 33, with G90 coating;
Material: Cold-rolled steel, ASTM A 1008/A 1008M, structural steel, Grade 33;

FASTENERS

General: Unless otherwise indicated, provide Type 304 or Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

Provide stainless-steel fasteners for fastening aluminum.
Provide stainless-steel fasteners for fastening stainless steel.

Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

Post-Installed Anchors: Torque-controlled expansion anchors.

Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

MISCELLANEOUS MATERIALS

Shop Primers: Provide primers that comply with Section 09 91 13 "Exterior Painting." Section 09 91 23 Interior Painting."

Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.

Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

Concrete: Comply with requirements in Section 03 30 00 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi.

FABRICATION, GENERAL

Shop Assembly: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.

Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.

Weld corners and seams continuously to comply with the following:

Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
Obtain fusion without undercut or overlap.
Remove welding flux immediately.
At exposed connections, finish exposed welds and surfaces smooth and blended.

Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Locate joints where least conspicuous.

Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors not less than 8 inches from ends and corners of units and 24 inches o.c.

MISCELLANEOUS FRAMING AND SUPPORTS
General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

Fabricate steel girders for wood frame construction from continuous steel shapes of sizes indicated.

Where wood nailers are attached to girders with bolts or lag screws, drill or punch holes at 24 inches o.c.

Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top plates as indicated. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.

STEEL WELD PLATES AND ANGLES
Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

LOOSE BEARING AND LEVELING PLATES
Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

LOOSE STEEL LINTELS
Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.

Galvanize loose steel lintels located in exterior walls.

Prime loose steel lintels located in exterior walls with zinc-rich primer.

FINISHES, GENERAL
Finish metal fabrications after assembly.

PART 3 - EXECUTION

INSTALLATION, GENERAL

Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

Field Welding: Comply with the following requirements:

- Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
- Obtain fusion without undercut or overlap.
- Remove welding flux immediately.
- At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.

Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

INSTALLING BEARING AND LEVELING PLATES

Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

ADJUSTING AND CLEANING

Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION

SECTION 05 51 19
METAL GRATING STAIRS

PART 1 - GENERAL

SUMMARY
Section Includes:

Stairs with steel-grating treads.
Steel railings and guards attached to metal stairs.

COORDINATION
Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.

ACTION SUBMITTALS
Product Data: For metal grating stairs and the following:

Gratings.
Shop primer products.
Grout.

Shop Drawings:

Include plans, elevations, sections, details, and attachment to other work.
Indicate sizes of metal sections, thickness of metals, profiles, holes, and field joints.
Include plan at each level.
Indicate locations of anchors, weld plates, and blocking for attachment of wall-mounted handrails.

Delegated-Design Submittal: For stairs, railings, and guards, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

INFORMATIONAL SUBMITTALS
Qualification Data: For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the jurisdiction in which Project is located.

Welding certificates.

QUALITY ASSURANCE
Installer Qualifications: Fabricator of products.

Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design stairs, railings, and guards, including attachment to building construction.

Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

Uniform Load: 100 lbf/sq. ft..
Concentrated Load: 300 lbf applied on an area of 4 sq. in..
Uniform and concentrated loads need not be assumed to act concurrently.
Stair Framing: Capable of withstanding stresses resulting from railing and guard loads in addition to loads specified above.
Limit deflection of treads, platforms, and framing members to L/360.

Structural Performance of Railings and Guards: Railings and guards, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

Handrails and Top Rails of Guards:

Uniform load of 50 lbf/ft. applied in any direction.
Concentrated load of 200 lbf applied in any direction.
Uniform and concentrated loads need not be assumed to act concurrently.

Infill of Guards:

Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft..
Infill load and other loads need not be assumed to act concurrently.

Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

METALS

Steel Plates, Shapes, and Bars: ASTM A36/A36M.

Rolled-Steel Floor Plate: ASTM A786/A786M, rolled from plate complying with ASTM A36/A36M or ASTM A283/A283M, Grade C or D.

Steel Bars for Grating Treads: ASTM A36/A36M or steel strip, ASTM A1011/A1011M or ASTM A1018/A1018M.

Steel Wire Rod for Grating Crossbars: ASTM A510/A510M.

Aluminum Bars for Grating Treads: ASTM B221 extruded aluminum, alloys as follows:

6061-T6 or 6063-T6, for bearing bars of gratings and shapes.
6061-T1, for grating crossbars.

Steel Tubing for Railings and Guards: ASTM A500/A500M (cold formed) or ASTM A513/A513M.

Provide galvanized finish for exterior installations and where indicated.

Steel Pipe for Railings and Guards: ASTM A53/A53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.

Provide galvanized finish for exterior installations and where indicated.

FASTENERS

General: Provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5 where built into exterior walls.

Select fasteners for type, grade, and class required.

Fasteners for Anchoring Railings and Guards to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings and guards to other types of construction indicated and capable of withstanding design loads.

Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E488/E488M, conducted by a qualified independent testing agency.

Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.

Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F593, and nuts, ASTM F594.

MISCELLANEOUS MATERIALS

Shop Primers: Provide primers that comply with Section 09 91 13 "Exterior Painting" .

Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout; recommended by manufacturer for exterior use; noncorrosive and nonstaining; mixed with water to consistency suitable for application and a 30-minute working time.

FABRICATION, GENERAL

Provide complete stair assemblies, including metal framing, hangers, railings, guards, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.

Join components by welding unless otherwise indicated.

Use connections that maintain structural value of joined pieces.

Assemble stairs, railings, and guards in shop to greatest extent possible.

Disassemble units only as necessary for shipping and handling limitations.

Clearly mark units for reassembly and coordinated installation.

Cut, drill, and punch metals cleanly and accurately.

Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated.

Remove sharp or rough areas on exposed surfaces.

Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

Form exposed work with accurate angles and surfaces and straight edges.

Weld connections to comply with the following:

Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
Obtain fusion without undercut or overlap.
Remove welding flux immediately.
Weld exposed corners and seams continuously unless otherwise indicated.
At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish # 3 - Partially dressed weld with spatter removed.

Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.

Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated.
Locate joints where least conspicuous.
Fabricate joints that are exposed to weather in a manner to exclude water.
Provide weep holes where water may accumulate internally.

FABRICATION OF STEEL-FRAMED STAIRS

NAAMM Stair Standard: Comply with NAAMM AMP 510, "Metal Stairs Manual," for Industrial Class, unless more stringent requirements are indicated.

Stair Framing:

Fabricate stringers of steel plates or channels.

Stringer Size: As required to comply with "Performance Requirements" Article.
Provide closures for exposed ends of channel stringers.
Finish: Galvanized.

Construct platforms and tread supports of steel plate or channel headers and miscellaneous framing members as required to comply with "Performance Requirements" Article.

Provide closures for exposed ends of channel framing.
Finish: Galvanized.

Weld or bolt stringers to headers; weld or bolt framing members to stringers and headers.

Metal Bar-Grating Stairs: Form treads and platforms to configurations shown from metal bar grating; fabricate to comply with NAAMM MBG 531, "Metal Bar Grating Manual."

Fabricate treads and platforms from welded steel or pressure-locked steel grating with 1-by-1/8-inch bearing bars at 7/16 inch o.c. and crossbars at 4 inches o.c.
Fabricate treads and platforms from welded steel or pressure-locked steel grating with openings in gratings no more than 1/2 inch in least dimension.

Surface: Plain.
Finish: Galvanized.

Fabricate grating treads with rolled-steel floor plate nosing and with steel angle or steel plate carrier at each end for stringer connections.

Secure treads to stringers with bolts.

Fabricate grating platforms with nosing matching that on grating treads.

Secure grating to platform framing with bolts.

Risers: Solid.

Toe Plates: Provide toe plates around openings and at edge of open-sided floors and platforms, and at open ends and open back edges of treads.

Material and Finish: Steel plate to match finish of other steel items.
Fabricate to dimensions and details indicated.

FABRICATION OF STAIR RAILINGS AND GUARDS

Fabricate railings and guards to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of member, post spacings, wall bracket spacing, and anchorage, but not less than that needed to withstand indicated loads.

Rails and Posts: 1-5/8-inch-diameter top and bottom rails and 1-1/2-inch-square posts.
Picket Infill: 3/4-inch round pickets spaced to prohibit the passage of a 4-inch diameter sphere.

Welded Connections: Fabricate railings and guards with welded connections.

Fabricate connections that are exposed to weather in a manner that excludes water.

Provide weep holes where water may accumulate internally.

Cope components at connections to provide close fit, or use fittings designed for this purpose.
Weld all around at connections, including at fittings.
Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
Obtain fusion without undercut or overlap.
Remove flux immediately.
Finish welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #3 - Partially dressed weld with spatter removed as shown in NAAMM AMP 521.

Form changes in direction of railings and guards as follows:

By bending or by inserting prefabricated elbow fittings.
By flush bends or by inserting prefabricated flush-elbow fittings.

For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required.

Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

Close exposed ends of railing and guard members with prefabricated end fittings.

Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.

Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

Connect posts to stair framing by direct welding unless otherwise indicated.

Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work.

Furnish inserts and other anchorage devices for connecting to concrete or masonry work.
For galvanized railings and guards, provide galvanized fittings, brackets, fasteners, sleeves, and other ferrous-metal components.

For nongalvanized railings and guards, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.

Provide type of bracket with predrilled hole for exposed bolt anchorage and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.

Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports.

Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.

FINISHES

Finish metal stairs after assembly.

Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.

Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.

Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

Apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes and those to be embedded in concrete or masonry unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

INSTALLATION OF METAL STAIRS

Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction.

Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.

Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.

Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete unless otherwise indicated.

Grouted Baseplates: Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces.

Clean bottom surface of baseplates.

Set steel-stair baseplates on wedges, shims, or leveling nuts.

After stairs have been positioned and aligned, tighten anchor bolts.

Do not remove wedges or shims, but if protruding, cut off flush with edge of bearing plate before packing with grout.

Promptly pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

Neatly finish exposed surfaces; protect grout and allow to cure.
Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

Fit exposed connections accurately together to form hairline joints.

Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
Comply with requirements for welding in "Fabrication, General" Article.

INSTALLATION OF RAILINGS AND GUARDS

Adjust railing and guard systems before anchoring to ensure matching alignment at abutting joints with tight, hairline joints.

Space posts at spacing indicated or, if not indicated, as required by design loads.
Plumb posts in each direction, within a tolerance of 1/16 inch in 3 feet.
Align rails and guards so variations from level for horizontal members and variations from parallel with rake of stairs for sloping members do not exceed 1/4 inch in 12 feet.
Secure posts, rail ends, and guard ends to building construction as follows:

Anchor posts to steel by welding or bolting to steel supporting members.
Anchor handrail and guard ends to concrete and masonry with steel round flanges welded to rail and guard ends and anchored with post-installed anchors and bolts.

Attach handrails to wall with wall brackets.

Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
Secure wall brackets to building construction as required to comply with performance requirements.

REPAIR

Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 91 13 "Exterior Painting".

Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION

Page Intentionally Left Blank

SECTION 06 10 00
ROUGH CARPENTRY

PART 1 - GENERAL

SUMMARY
Section Includes:
- Framing with dimension lumber.
- Framing with engineered wood products.
- Rooftop equipment bases and support curbs.
- Wood blocking and nailers.
- Wood furring.
- Wood sleepers.
- Wall Sheathing
- Plywood backing panels.

ACTION SUBMITTALS
Product Data: For each type of process and factory-fabricated product.

INFORMATIONAL SUBMITTALS
Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

PART 2 - PRODUCTS

WOOD PRODUCTS, GENERAL
Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

- Factory mark each piece of lumber with grade stamp of grading agency.
- For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
- Dress lumber, S4S, unless otherwise indicated.

Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less; 19 percent for more than 2-inch nominal thickness unless otherwise indicated.

Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

- Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

WOOD-PRESERVATIVE-TREATED LUMBER
Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

- Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.

Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

Application: Treat all rough carpentry unless otherwise indicated.

Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
Wood floor plates that are installed over concrete slabs-on-grade.

DIMENSION LUMBER FRAMING

Framing Other Than Non-Load-Bearing Partitions: No. 2 grade.

Application: Framing other than interior partitions.
Species:

Hem-fir (north); NLGA.
Southern pine; SPIB.
Douglas fir-larch; WCLIB or WWPA.
Southern pine or mixed southern pine; SPIB.
Spruce-pine-fir; NLGA.
Douglas fir-south; WWPA.
Hem-fir; WCLIB or WWPA.
Douglas fir-larch (north); NLGA.
Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

Framing Other Than Non-Load-Bearing Partitions: Any species and grade with a modulus of elasticity of at least 1,500,000 psi and an extreme fiber stress in bending of at least 1000 psi 2-inch nominal thickness and 12-inch nominal width for single-member use.

Application: Framing other than interior partitions.

Exposed Framing: Hand-select material for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.

Species and Grade: As indicated above for load-bearing construction of same type.

ENGINEERED WOOD PRODUCTS

Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559.

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Boise Cascade Corporation
Georgia-Pacific Building Products
Louisiana-Pacific Corporation
Weyerhaeuser Company

Extreme Fiber Stress in Bending, Edgewise: 3100 psi for 12-inch nominal-depth members.
Modulus of Elasticity, Edgewise: 2,000,000 psi.

MISCELLANEOUS LUMBER

General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

Blocking.
Nailers.
Rooftop equipment bases and support curbs.
Cants.
Furring.
Grounds.

Dimension Lumber Items: Construction or No. 2 grade lumber of any species.

Concealed Boards: 15 percent maximum moisture content and any of the following species and grades:

Mixed southern pine or southern pine; No. 2 grade; SPIB.
Eastern softwoods; No. 2 Common grade; NeLMA.
Northern species; No. 2 Common grade; NLGA.
Western woods; Construction or No. 2 Common grade; WCLIB or WWPA.

WALL SHEATHING

Plywood Sheathing: Either DOC PS 1 or DOC PS 2, Exposure 1, Structural I sheathing.

PLYWOOD BACKING PANELS

Equipment Backing Panels: Plywood, DOC PS 1, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

FASTENERS

General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.

Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 as appropriate for the substrate.

METAL FRAMING ANCHORS

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Simpson Strong-Tie Co., Inc.
USP Structural Connectors

Allowable design loads, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

Use for interior locations unless otherwise indicated.

Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

Use for wood-preservative-treated lumber and where indicated.

MISCELLANEOUS MATERIALS

Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

PART 3 - EXECUTION

INSTALLATION, GENERAL

Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

Do not splice structural members between supports unless otherwise indicated.

Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
ICC-ES evaluation report for fastener.

PROTECTION

Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet enough that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

Page Intentionally Left Blank

SECTION 06 17 53
SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

SUMMARY
Section Includes:
- Wood roof trusses.
- Wood girder trusses.

ACTION SUBMITTALS
Product Data: For metal-plate connectors, metal truss accessories, and fasteners.

Shop Drawings: Show fabrication and installation details for trusses.

- Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
- Indicate sizes, stress grades, and species of lumber.
- Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
- Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
- Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
- Show splice details and bearing details.

Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

INFORMATIONAL SUBMITTALS
Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss-fabricating firm.
Evaluation Reports: For the following, from ICC-ES:

- Metal-plate connectors.
- Metal truss accessories.

QUALITY ASSURANCE
Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.

- Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
- Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

Fabricator Qualifications: Shop that participates in a recognized quality-assurance program, complies with quality-control procedures in TPI 1, and involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.

DELIVERY, STORAGE, AND HANDLING
Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS

Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design metal-plate-connected wood trusses.

Structural Performance: Metal-plate-connected wood trusses shall be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1.

Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.

Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

DIMENSION LUMBER

Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

Provide dry lumber with 15 percent maximum moisture content at time of dressing.

Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 06 10 00 "Rough Carpentry."

METAL CONNECTOR PLATES

General: Fabricate connector plates to comply with TPI 1.

Hot-Dip Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 coating designation; and not less than 0.036 inch thick.

FASTENERS

General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.

Where trusses are exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

Nails, Brads, and Staples: ASTM F 1667.

METAL FRAMING ANCHORS AND ACCESSORIES

Allowable design loads, as published by manufacturer, shall comply with or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

FABRICATION

Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.

Fabricate wood trusses within manufacturing tolerances in TPI 1.

Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

PART 3 - EXECUTION

INSTALLATION

Install wood trusses only after supporting construction is in place and is braced and secured.

If trusses are delivered to Project site in more than one piece, assemble trusses before installing.

Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.

Install and brace trusses according to TPI recommendations and as indicated.

Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.

Securely connect each truss ply required for forming built-up girder trusses.

Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.

Install bracing to comply with Section 06 10 00 "Rough Carpentry."

Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.

Install wood trusses within installation tolerances in TPI 1.

Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.

Replace wood trusses that are damaged or do not comply with requirements.

END OF SECTION

Page Intentionally Left Blank

SECTION 06 20 13
EXTERIOR FINISH CARPENTRY

PART 1 - GENERAL

SUMMARY
Section Includes:
Exterior Hardboard Wood Substrate trim.
Hardboard Wood Substrate siding.

DEFINITIONS
MDO: Plywood with a medium-density overlay on the face.

ACTION SUBMITTALS
Product Data: For each type of process and factory-fabricated product.

Samples: For each type of product involving selection of colors, profiles, or textures.

INFORMATIONAL SUBMITTALS
Compliance Certificates:
For lumber that is not marked with grade stamp.
For preservative-treated wood that is not marked with treatment-quality mark.

Evaluation Reports: For the following, from ICC-ES:
Wood-preservative-treated wood.
Cellular PVC trim.
Foam plastic moldings.

PART 2 - PRODUCTS

MATERIALS, GENERAL
Hardboard Substrate: ANSI A135.4.

EXTERIOR TRIM
Manufacturers: Subject to compliance with requirements, provide products by the following:
LP SmartSide Building Products

Provide pre-finished band board as required to complete the work.

Exterior-grade phenolic resin-saturated paper overlay laminated to EPA-registered zinc-borate-preservative treated engineered wood siding; structurally rated; QWPA compliant; exposed edges sealed for moisture resistance; primed and painted.

Trim material to be as follows:
Type: 440 Series Cedar Texture Trim, 0.625inch-thick by 7.21inch-wide trim board.

HARDBOARD SIDING
Manufacturers: Subject to compliance with requirements, provide products by the following:
LP SmartSide Building Products

Hardboard Siding: ANSI A135.6, primed with manufacturer's standard exterior primer.

Type: 7/16-inch-thick by 6-inch- wide lap siding.
Type: 38 Series Cedar Texture Panel 8” o.c. LP Smartside Lap Panel (Board and Batten).

MISCELLANEOUS MATERIALS

Fasteners for Exterior Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches into wood substrate.

For face-fastening siding, provide ringed-shank siding nails or hot-dip galvanized-steel siding nails.

For prefinished items, provide matching prefinished aluminum fasteners where face fastening is required.

For applications not otherwise indicated, provide hot-dip galvanized-steel fasteners.

Flashing: Comply with requirements in Section 07 62 00 "Sheet Metal Flashing and Trim" for flashing materials installed in exterior finish carpentry.

Sealants: Latex, complying with ASTM C 834 Type OP, Grade NF and applicable requirements in Section 07 92 00 "Joint Sealants" and recommended by sealant and substrate manufacturers for intended application.

PART 3 - EXECUTION

PREPARATION

Prime lumber and moldings to be painted, including both faces and edges, unless factory primed. Cut to required lengths and prime ends. Comply with requirements in Section 09 91 13 "Exterior Painting."

INSTALLATION, GENERAL

Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.

Scribe and cut exterior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.

Install stairs with no more than 3/16-inch variation between adjacent treads and risers and with no more than 3/8-inch variation between largest and smallest treads and risers within each flight.

STANDING AND RUNNING TRIM INSTALLATION

Install flat-grain lumber with bark side exposed to weather.

Install cellular PVC trim to comply with manufacturer's written instructions.

Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long, except where necessary.

Use scarf joints for end-to-end joints.

Stagger end joints in adjacent and related members.

Fit exterior joints to exclude water. Cope at returns and miter at corners to produce tight-fitting joints, with full-surface contact throughout length of joint. Plane backs of casings to provide uniform thickness across joints, where necessary for alignment.

SIDING INSTALLATION

Install siding to comply with manufacturer's written instructions and warranty requirements.

Horizontal Lumber Siding: Apply starter strip along bottom edge of sheathing or sill. Install first course of siding, with lower edge at least 1/8 inch below starter strip and subsequent courses lapped 1 inch over course below. Nail at each stud. Do not allow nails to penetrate more than one thickness of siding.

Plywood Siding: Install panels with edges over framing or blocking. Nail at 6 inches o.c. at panel perimeter and 12 inches o.c. at intermediate supports unless manufacturer recommends closer spacing. Leave 1/16-

inch gap between adjacent panels and 1/8-inch gap at perimeter, openings, and horizontal joints unless otherwise recommended by panel manufacturer.

Seal butt joints at inside and outside corners and at trim locations.
Install continuous metal flashing at horizontal panel joints.

Hardboard Siding: Install hardboard siding to comply with manufacturer's recommendations. Install panels with edges over framing or blocking. Leave 3/16-inch gap at perimeter, openings, and horizontal panel joints unless otherwise recommended by panel manufacturer.

Seal butt joints at inside and outside corners and at trim locations.
Conceal fasteners to greatest practical extent by placing in grooves of siding pattern or by concealing with applied trim or battens as detailed.

END OF SECTION

Page Intentionally Left Blank

SECTION 06 20 23
INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

SUMMARY
Section Includes:
Shelving and clothes rods.

Related Requirements:
Section 09 91 23 "Interior Painting" for priming and backpriming of interior finish carpentry.

ACTION SUBMITTALS
Product Data: For each type of process and factory-fabricated product.

Samples: For each type of paneling.

PART 2 - PRODUCTS

MATERIALS, GENERAL
Lumber: DOC PS 20.

Factory mark each piece of lumber with grade stamp of grading agency.
For exposed lumber, mark grade stamp on end or back of each piece.

Softwood Plywood: DOC PS 1.

Hardboard: ANSI A135.4.

MDF: ANSI A208.2, Grade 130.

Particleboard: ANSI A208.1, Grade M-2.

Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.

Color: As selected by Architect from manufacturer's full range

SHELVING AND CLOTHES RODS
Exposed, Closet, and/or Utility Shelving: Made from one of the following materials, 3/4 inch thick.

Particleboard with radiused and filled front edge (**for Utility Shelving only**).
MDF with solid-wood front edge.
MDO softwood plywood with solid-wood edge.
Softwood Boards: Kiln-dried Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine, Premium or 2 Common (Sterling); NeLMA, NLGA, or WWPA.
Softwood Boards: Kiln-dried Douglas fir-larch, Douglas fir south, or hem-fir, Prime or D finish; NLGA, WCLIB, or WWPA; or southern pine, C finish; SPIB.

Shelf Cleats: 3/4-by-3-1/2-inch boards, as specified above for shelving.

Shelf Brackets with Rod Support: BHMA A156.16, B04051; prime-painted formed steel.

Shelf Brackets without Rod Support: BHMA A156.16, B04041; prime-painted formed steel.

Clothes Rods: 1-1/2-inch-diameter.

MISCELLANEOUS MATERIALS

Low-Emitting Materials: Adhesives shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.

Multipurpose Construction Adhesive: Formulation complying with ASTM D 3498 that is recommended for indicated use by adhesive manufacturer.

PART 3 - EXECUTION

PREPARATION

Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

INSTALLATION, GENERAL

Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.

Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.

Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.

Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.

Install stairs with no more than 3/16-inch variation between adjacent treads and risers and with no more than 3/8-inch variation between largest and smallest treads and risers within each flight.

SHELVING AND CLOTHES ROD INSTALLATION

Cut shelf cleats at ends of shelves about 1/2 inch less than width of shelves and sand exposed ends smooth.

Install shelf cleats by fastening to framing or backing with finish nails or trim screws, set below face and filled. Space fasteners not more than 16 inches o.c.

Install shelf brackets according to manufacturer's written instructions, spaced not more than 36 inches o.c. Fasten to framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.

Cut shelves to neatly fit openings with only enough gap to allow shelves to be removed and reinstalled. Install shelves, fully seated on cleats, brackets, and supports.

END OF SECTION

SECTION 06 41 16
PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

SUMMARY
Section Includes:

Plastic-laminate-faced architectural cabinets.
Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets that are not concealed within other construction.

ACTION SUBMITTALS
Product Data: For each type of product, including panel products high-pressure decorative laminate adhesive for bonding plastic laminate and cabinet hardware and accessories.

Shop Drawings: For plastic-laminate-faced architectural cabinets.
Include plans, elevations, sections, and attachment details.

Samples: For each exposed product and for each color and texture specified.

INFORMATIONAL SUBMITTALS
Quality Standard Compliance Certificates: AWI Quality Certification Program.

QUALITY ASSURANCE
Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

Installer Qualifications: Fabricator of products and certified participant in AWI's Quality Certification Program.

PART 2 - PRODUCTS

PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS
Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of cabinets indicated for construction, finishes, installation, and other requirements.

Provide inspections of fabrication and installation together with labels and certificates from AWI certification program indicating that woodwork complies with requirements of grades specified.

Grade: Custom.

Type of Construction: Frameless.

Door and Drawer-Front Style: Flush overlay.

High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.

Laminate Cladding for Exposed Surfaces:

Horizontal Surfaces: Grade HGL.
Postformed Surfaces: Grade HGP.
Vertical Surfaces: Grade VGS.
Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.

Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.

Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

As selected by Architect from laminate manufacturer's full range in the following categories:
Solid colors, matte finish.
Solid colors with core same color as surface, matte finish.
Wood grains, matte finish.
Patterns, matte finish.

WOOD MATERIALS

Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

Wood Moisture Content: 4 to 9 percent.

Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.
Particleboard: ANSI A208.1, Grade M-2.
Straw-Based Particleboard: ANSI A208.1, Grade M-2, except for density.

Softwood Plywood: DOC PS 1.
Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

CABINET HARDWARE AND ACCESSORIES

General: Provide cabinet hardware and accessory materials associated with architectural cabinets.

Butt Hinges: 2-3/4-inch, five-knuckle steel hinges made from 0.095-inch-thick metal, and as follows:

Semiconcealed Hinges for Flush Doors: BHMA A156.9, B01361.
Semiconcealed Hinges for Overlay Doors: BHMA A156.9, B01521.

Wire Pulls: Back mounted, solid metal, 5 inches long, 2-1/2 inches deep, and 5/16 inch in diameter.

Catches: Magnetic catches, BHMA A156.9, B03141.

Adjustable Shelf Standards and Supports: BHMA A156.9, B04102; with shelf brackets, B04112.

Shelf Rests: BHMA A156.9, B04013; metal, two-pin type with shelf hold-down clip.

Drawer Slides: BHMA A156.9.

Grade 1 and Grade 2: Side mounted and extending under bottom edge of drawer; full-extension type; epoxy-coated steel with polymer rollers.
Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
For drawers not more than 3 inches high and not more than 24 inches wide, provide Grade 1.

For drawers more than 3 inches high, but not more than 6 inches high and not more than 24 inches wide, provide Grade 1HD-100.
For drawers more than 6 inches high or more than 24 inches wide, provide Grade 1HD-200.

Door Locks: BHMA A156.11, E07121.
Drawer Locks: BHMA A156.11, E07041.

Door and Drawer Silencers: BHMA A156.16, L03011.

Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.

MISCELLANEOUS MATERIALS

Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.

Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

FABRICATION

Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

INSTALLATION

Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

Grade: Install cabinets to comply with quality standard grade of item to be installed.

Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.

Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.

Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips.

END OF SECTION

Page Intentionally Left Blank

SECTION 07 21 00
THERMAL INSULATION

PART 1 - GENERAL

SUMMARY
Section Includes:
- Extruded polystyrene foam-plastic board.
- Glass-fiber blanket.

ACTION SUBMITTALS
Product Data: For each type of product.

INFORMATIONAL SUBMITTALS
Product test reports.
Research reports.

PART 2 - PRODUCTS

EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD
Extruded polystyrene boards in this article are also called "XPS boards."

Extruded Polystyrene Board, Type X: ASTM C 578, Type X, 15-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

POLYISOCYANURATE FOAM-PLASTIC BOARD INSULATION
Polyisocyanurate Board Insulation, Foil Faced: ASTM C1289, foil faced, Type I, Class 1 or 2.

Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

GLASS-FIBER BLANKET
Glass-Fiber Blanket, Unfaced: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

A thermal resistance (r) identification mark shall be applied by the manufacturer to each piece of building envelope insulation.

PART 3 - EXECUTION

INSTALLATION, GENERAL
Comply with insulation manufacturer's written instructions applicable to products and applications.

Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

INSTALLATION OF FOUNDATION WALL INSULATION

Butt panels together for tight fit.

Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors.

Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.

Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.

Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.

For wood-framed construction, install blankets according to ASTM C 1320 and as follows:

With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.

Exterior Walls: Set units with facing placed toward interior of construction.

END OF SECTION

SECTION 07 25 00
WEATHER BARRIERS

PART 1 - GENERAL

SUMMARY
Section Includes:
- Building paper.
- Building wrap.
- Flexible flashing.

ACTION SUBMITTALS
Product Data: For each type of product.

INFORMATIONAL SUBMITTALS
Evaluation Reports: For water-resistive barrier and flexible flashing, from ICC-ES.

PART 2 - PRODUCTS

WATER-RESISTIVE BARRIER
Building Paper: ASTM D 226, Type 1 (No. 15 asphalt-saturated organic felt), unperforated.

Building Paper: Water-vapor-permeable, asphalt-saturated kraft building paper that complies with ICC-ES AC38, Grade D; except with water-resistance rating not less than 1 hour.

Building Wrap: ASTM E 1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.

Manufacturers: Description is based on Green Guard RainDrop 3D. Other manufactures may submit subject to compliance with performance requirements.

Water Resistance: 120 minutes
Water Penetration Resistance: 600 CM H2O
Drainage Efficiency: 90% water drained
Water-Vapor Permeance: 16 perms per ASTM E 96/E 96M, Desiccant Method (Procedure A).
Water Vapor Transmission Rate: 128 g/m²/24 hrs.
Air Permeance: 0.001 L/s/m² @ 75 Pa
Flame Propagation Test: Materials and construction shall be as tested according to ASTM E 84.

Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

FLEXIBLE FLASHING
Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

Rubberized-Asphalt Flashing: Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

PART 3 - EXECUTION

WATER-RESISTIVE BARRIER INSTALLATION

Cover sheathing with water-resistive barrier as follows:

- Cut back barrier 1/2 inch on each side of the break in supporting members at expansion- or control-joint locations.
- Apply barrier to cover vertical flashing with a minimum 4-inch overlap unless otherwise indicated.

Building Paper: Apply horizontally with a 2-inch overlap and a 6-inch end lap; fasten to sheathing with galvanized staples or roofing nails.

Building Wrap: Comply with manufacturer's written instructions and warranty requirements.

- Seal seams, edges, fasteners, and penetrations with tape.
- Extend into jambs of openings and seal corners with tape.

FLEXIBLE FLASHING INSTALLATION

Apply flexible flashing where indicated to comply with manufacturer's written instructions.

- Lap seams and junctures with other materials at least 4 inches except that at flashing flanges of other construction, laps need not exceed flange width.
- Lap flashing over water-resistive barrier at bottom and sides of openings.
- Lap water-resistive barrier over flashing at heads of openings.

END OF SECTION

SECTION 07 26 00
VAPOR RETARDERS

PART 1 - GENERAL

SUMMARY
Section Includes:
Polyethylene vapor retarders.
Reinforced-polyethylene vapor retarders.

Related Requirements:
Section 03 30 00 "Cast-in-Place Concrete" for under-slab vapor retarders.
Section 07 21 00 "Thermal Insulation" for vapor retarders integral with insulation products.

ACTION SUBMITTALS
Product Data: For each type of product.

INFORMATIONAL SUBMITTALS
Product test reports.

PART 2 - PRODUCTS

POLYETHYLENE VAPOR RETARDERS
Polyethylene Vapor Retarders: ASTM D 4397, 6-mil- thick sheet, with maximum permeance rating of 0.1 perm. 10-mil thick sheet under concrete slab.

REINFORCED-POLYETHYLENE VAPOR RETARDERS
Reinforced-Polyethylene Vapor Retarders: Sheet with outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 20 lb/1000 sq. ft., with maximum permeance rating of 0.1 perm.

PART 3 - EXECUTION

INSTALLATION OF VAPOR RETARDERS ON FRAMING
Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives, vapor retarder fasteners, or other anchorage system as recommended by manufacturer. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs and sealing with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Locate all joints over framing members or other solid substrates.

Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.

Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

INSTALLATION OF VAPOR RETARDERS IN CRAWL SPACES
Install vapor retarders over prepared grade. Lap joints a minimum of 12 inches and seal with manufacturer's recommended tape. Install second layer over pathways to equipment.

Extend vapor retarder over footings and seal to foundation wall or grade beam with manufacturer's recommended tape.

Extend vapor retarder vertically minimum 16 inches above top of footing.

Seal around penetrations such as utilities and columns in order to create a monolithic, airtight membrane at grade surface, perimeter, and all vertical penetrations.

END OF SECTION

SECTION 07 42 93
SOFFIT PANELS

PART 1 - GENERAL

SUMMARY
Section includes metal soffit panels.

PREINSTALLATION MEETINGS
Pre-installation Conference: Conduct conference at Project site.

ACTION SUBMITTALS
Product Data: For each type of product.

Shop Drawings: Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.

Samples: For each type of metal panel indicated.

INFORMATIONAL SUBMITTALS
Product test reports.
Warranties: Samples of special warranties.

CLOSEOUT SUBMITTALS
Maintenance data.

WARRANTY
Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

Warranty Period: Two years from date of Substantial Completion.

Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:

Wind Loads: As indicated on Drawings.
Other Design Loads: As indicated on Drawings.
Deflection Limits: For wind loads, no greater than 1/180 of the span.

Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 283 at the following test-pressure difference:

Test-Pressure Difference: 1.57 lbf/sq. ft.

Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:

Test-Pressure Difference: 2.86 lbf/sq. ft..

Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

METAL SOFFIT PANELS

General: Provide metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.

Flush-Profile Metal Soffit Panels: Perforated panels formed with vertical panel edges and intermediate stiffening ribs symmetrically spaced between panel edges; with flush joint between panels.

Aluminum Sheet: Coil-coated sheet, ASTM B 209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.

Thickness: 0.040 inch.
Surface: Smooth, flat finish.
Exterior Finish: Two-coat fluoropolymer.
Color: As selected by Architect from manufacturer's full range.

Panel Coverage: 12 inches.
Panel Height: 0.875 inch.

MISCELLANEOUS MATERIALS

Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 coating designation or ASTM A 792/A 792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

Panel Accessories: Provide components required for a complete, weathertight panel system including trim, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Finish flashing and trim with same finish system as adjacent metal panels.

Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

Panel Sealants: Provide sealant types recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.

Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/8 inch thick.

Joint Sealant: ASTM C 920; as recommended in writing by metal panel manufacturer.

Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

FABRICATION

General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.

Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

FINISHES

Panels and Accessories:

Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

Concealed Finish: White or light-colored acrylic or polyester backer finish.

PART 3 - EXECUTION

PREPARATION

Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

Soffit Framing: Wire tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.

METAL PANEL INSTALLATION

Metal Soffit Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.

Apply panels and associated items true to line for neat and weathertight enclosure.

Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.

Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.

Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.

Watertight Installation:

Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels and elsewhere as needed to make panels watertight.

Provide sealant or tape between panels and protruding equipment, vents, and accessories.

At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.

Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

CLEANING

Remove temporary protective coverings and strippable films, if any, as metal panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

END OF SECTION

SECTION 07 54 19
POLYVINYL-CHLORIDE (PVC) ROOFING

PART 1 - GENERAL

SUMMARY

Section Includes:

Mechanically fastened, polyvinyl chloride (PVC) roofing system.
Substrate board.
Cover board.
Walkways.

ACTION SUBMITTALS

Product Data: For each type of product.

For insulation and roof system component fasteners, include copy of SPRI's Directory of Roof Assemblies listing.

Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:

Layout and thickness of insulation.
Base flashings and membrane terminations.
Flashing details at penetrations.
Tapered insulation thickness and slopes.
Roof plan showing orientation of roof deck and orientation of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.
Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
Tie-in with air barrier.

Samples: For the following products:

Roof membrane and flashing, of color required.
Roof paver in each color and texture required.
Walkway pads or rolls, of color required.

Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

INFORMATIONAL SUBMITTALS

Manufacturer Certificates:

Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

Submit evidence of compliance with performance requirements.

Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

Product Test Reports: For roof membrane and insulation, tests performed by independent qualified testing agency indicating compliance with specified requirements.

Research reports.

Field Test Reports:

Concrete internal relative humidity test reports.
Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.

Field quality-control reports.

Sample warranties.

CLOSEOUT SUBMITTALS
Maintenance data.
Certified statement from existing roof membrane manufacturer stating that existing roof warranty has not been affected by Work performed under this Section.

QUALITY ASSURANCE
Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

WARRANTY
Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.

Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746, ASTM D4272/D4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

Wind Uplift Resistance: Design roofing system to resist required wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:

SPRI's Directory of Roof Assemblies Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in SPRI's Directory of Roof Assemblies for roof assembly identical for that specified for this Project.

Wind Uplift Load Capacity: 90 psf.

ENERGY STAR Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.

Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

POLYVINYL CHLORIDE (PVC) ROOFING

PVC Sheet: ASTM D4434/D4434M, Type IV, fabric reinforced.

Thickness: 40 mils.
Exposed Face Color: Dark gray.

AUXILIARY ROOFING MATERIALS

General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.

Adhesives and Sealants: Comply with VOC limits of authorities having jurisdiction.

Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet.

Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

Bonding Adhesive: Manufacturer's standard.

Water-Based, Fabric-Backed Membrane Adhesive: Roofing system manufacturer's standard water-based, cold-applied adhesive formulated for compatibility and use with fabric-backed membrane roofing.

Low-Rise, Urethane, Fabric-Backed Membrane Adhesive: Roof system manufacturer's standard spray-applied, low-rise, two-component urethane adhesive formulated for compatibility and use with fabric-backed membrane roofing.

Slip Sheet: ASTM D2178/D2178M, Type IV, glass fiber, asphalt-impregnated felt.

Slip Sheet: Manufacturer's standard, of thickness required for application.

Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.

Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

SUBSTRATE BOARDS

Substrate Board: ASTM C728, perlite board, sealed coated.

Thickness: 3/4 inch.

Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

ROOF INSULATION

Molded (Expanded) Polystyrene Board Insulation: ASTM C578, Type VIII, 1.15-lb/cu. ft. minimum density, 13-psi minimum compressive strength, square edge.

Thermal Resistance: R-value of 3.8 per inch.
Size: 48 by 96 inches.
Thickness:

Base Layer: 1-1/2 inches.
Upper Layer: varies.

Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.

Size: 48 by 48 inches.
Thickness:

Base Layer: 1-1/2 inches.
Upper Layer: varies.

Tapered Insulation: Provide factory-tapered insulation boards.

Material: Match roof insulation.
Minimum Thickness: 1/4 inch.
Slope:

Roof Field: 1/4 inch per foot unless otherwise indicated on Drawings.
Saddles and Crickets: 1/2 inch per foot unless otherwise indicated on Drawings.

INSULATION ACCESSORIES

Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:

Modified asphaltic, asbestos-free, cold-applied adhesive.
Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
Full-spread, spray-applied, low-rise, two-component urethane adhesive.

Cover Board: ASTM C208, Type II, Grade 2, cellulosic-fiber insulation board, 1/2 inch thick.

Cover Board: DOC PS 2, Exposure 1, oriented strand board, 7/16 inch thick.

Cover Board: ASTM C1289 Type II, Class 4, Grade 1, 1/2-inch thick polyisocyanurate, having a minimum compressive strength of 80 psi.

Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric, water permeable and resistant to UV degradation, type and weight as recommended by roofing system manufacturer for application.

BALLAST

Heavyweight Roof Pavers: Heavyweight, hydraulically pressed concrete units, square edged, factory cast for use as roof pavers; absorption not greater than 5 percent, ASTM C140/C140M; no breakage and maximum 1 percent mass loss when tested for freeze-thaw resistance, ASTM C67; and as follows:

Size: 24 by 24 inches. Manufacture pavers to dimensional tolerances of plus or minus 1/16 inch in length, height, and thickness.
Weight: 22 lb/sq. ft..

Compressive Strength: 7500 psi, minimum.
Colors and Textures: As selected by Architect from manufacturer's full range.

WALKWAYS
Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch thick and acceptable to roofing system manufacturer.

Size: Approximately 36 by 60 inches.
Color: Contrasting with roof membrane.

PART 3 - EXECUTION

EXAMINATION
Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

PREPARATION
Perform fastener-pullout tests according to roof system manufacturer's written instructions.

Submit test result within 24 hours of performing tests.

Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

INSTALLATION OF ROOFING, GENERAL
Install roofing system according to roofing system manufacturer's written instructions, SPRI's Directory of Roof Assemblies listed roof assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.

Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

INSTALLATION OF SUBSTRATE BOARD
Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches in adjacent rows.

At steel roof decks, install substrate board at right angle to flutes of deck.

Locate end joints over crests of steel roof deck.

Tightly butt substrate boards together.
Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.
Fasten substrate board to top flanges of steel deck according to recommendations in SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29.
Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to roofing system manufacturers' written instructions.
Loosely lay substrate board over roof deck.

INSTALLATION OF INSULATION
Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.

Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.

Installation Over Wood Panel Decking:

Mechanically fasten slip sheet to roof deck using mechanical fasteners specifically designed and sized for fastening slip sheet to wood panel decks.

Fasten slip sheet according to requirements in SPRI's Directory of Roof Assemblies for specified Wind Uplift Load Capacity.

Fasten slip sheet to resist specified uplift pressure at corners, perimeter, and field of roof.

Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows.

Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.

Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.

Make joints between adjacent insulation boards not more than 1/4 inch in width.

At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.

Trim insulation so that water flow is unrestricted.

Fill gaps exceeding 1/4 inch with insulation.

Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

Loosely lay base layer of insulation units over substrate.

Mechanically attach base layer of insulation and substrate board using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to wood panel decks.

Fasten insulation according to requirements in SPRI's Directory of Roof Assemblies for specified Wind Uplift Load Capacity.

Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.

Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.

Staggered end joints within each layer not less than 24 inches in adjacent rows.

Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.

Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.

Make joints between adjacent insulation boards not more than 1/4 inch in width.

At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.

Trim insulation so that water flow is unrestricted.

Fill gaps exceeding 1/4 inch with insulation.

Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

Loosely lay each layer of insulation units over substrate.

Adhere each layer of insulation to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:

Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.

Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

INSTALLATION OF COVER BOARDS

Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction.

Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.

At internal roof drains, conform to slope of drain sump.

Trim cover board so that water flow is unrestricted.

Cut and fit cover board tight to nailers, projections, and penetrations.

Adhere cover board to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:

Set cover board in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

Install slip sheet over cover board and immediately beneath roof membrane.

INSTALLATION OF MECHANICALLY FASTENED ROOF MEMBRANE

Mechanically fasten roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

Unroll roof membrane and allow to relax before installing.

For in-splice attachment, install roof membrane with long dimension perpendicular to steel roof deck flutes.

Start installation of roofing in presence of roofing system manufacturer's technical personnel.

Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

Mechanically fasten or adhere roof membrane securely at terminations, penetrations, and perimeter of roofing.

Apply roof membrane with side laps shingled with slope of roof deck where possible.

In-Seam Attachment: Secure one edge of PVC sheet using fastening plates or metal battens centered within seam, and mechanically fasten PVC sheet to roof deck.

Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings to ensure a watertight seam installation.

Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.

Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.

Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

INSTALLATION OF BASE FLASHING

Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

INSTALLATION OF WALKWAYS

Flexible Walkways: Install walkway products according to manufacturer's written instructions.

Install flexible walkways at the following locations:

Perimeter of each rooftop unit.
Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
As required by roof membrane manufacturer's warranty requirements.

Provide 6-inch clearance between adjoining pads.
Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

PROTECTING AND CLEANING

Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

SUMMARY
Section Includes:
Formed low-slope roof sheet metal fabrications.
Formed wall sheet metal fabrications.

ACTION SUBMITTALS
Product Data: For each type of product.

Shop Drawings: For sheet metal flashing and trim.
Include plans, elevations, sections, and attachment details.
Distinguish between shop- and field-assembled work.
Include identification of finish for each item.
Include pattern of seams and details of termination points, expansion joints and expansion-joint covers, direction of expansion, roof-penetration flashing, and connections to adjoining work.

Samples: For each exposed product and for each color and texture specified.

INFORMATIONAL SUBMITTALS
Product certificates.
Product test reports.
Sample warranty.

CLOSEOUT SUBMITTALS
Maintenance data.

QUALITY ASSURANCE
Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.

WARRANTY
Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

SPRI Wind Design Standard: Manufacture and install roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressure:

Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

SHEET METALS

General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 coating designation or aluminum-zinc alloy-coated steel sheet according to ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; prepainted by coil-coating process to comply with ASTM A 755/A 755M.

Surface: Manufacturer's standard clear acrylic coating on both sides.

Exposed Coil-Coated Finish:

Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with dry film thickness of not less than 0.2 mil for primer and 0.8 mil for topcoat.

Color: As selected by Architect from manufacturer's full range.

MISCELLANEOUS MATERIALS

General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.

Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.

Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.

Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

FABRICATION, GENERAL

General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

- Obtain field measurements for accurate fit before shop fabrication.
- Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
- Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

- Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
- Use lapped expansion joints only where indicated on Drawings.

Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

ROOF-DRAINAGE SHEET METAL FABRICATIONS

Hanging Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch-long sections. Furnish flat-stock gutter brackets and gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.

Downspouts: Fabricate rectangular open-face downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.

Hanger Style: Per manufacturer.
Fabricate from the following materials:

Galvanized Steel: 0.022 inch thick.
Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

LOW-SLOPE ROOF SHEET METAL FABRICATIONS

Roof Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long sections. Furnish with 6-inch-wide, joint cover plates. Shop fabricate interior and exterior corners.

Fabricate from the Following Materials:

Galvanized Steel: 0.028 inch thick.
Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

WALL SHEET METAL FABRICATIONS

Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from the following materials:

Galvanized Steel: 0.022 inch thick.
Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

Wall Expansion-Joint Cover: Fabricate from the following materials:

Galvanized Steel: 0.028 inch thick.
Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

PART 3 - EXECUTION

UNDERLAYMENT INSTALLATION

Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

Synthetic Underlayment: Install synthetic underlayment, wrinkle free, according to manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.

Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller. Cover underlayment within 14 days.

INSTALLATION, GENERAL

General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.

Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.

Torch cutting of sheet metal flashing and trim is not permitted.

Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

Coat concealed side of sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.

Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.

Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.

Use lapped expansion joints only where indicated on Drawings.

Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

Seal joints as required for watertight construction. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work.

Do not solder metallic-coated steel sheet.

Do not use torches for soldering.

Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

Copper Soldering: Tin edges of uncoated sheets, using solder for copper.

Rivets: Rivet joints in uncoated aluminum where necessary for strength.

ROOF-DRAINAGE SYSTEM INSTALLATION

General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

Hanging Gutters: Join sections with joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.

Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet apart.

Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c.

Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints minimum of 4 inches in direction of water flow.

ROOF FLASHING INSTALLATION

General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate.

CLEANING AND PROTECTION

Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

Clean and neutralize flux materials. Clean off excess solder.

Clean off excess sealants.

Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

END OF SECTION

SECTION 07 90 00
JOINT PROTECTION

PART 1 GENERAL

SUMMARY

Provide sealant work as shown and as specified. Applicable provisions of Division 1 shall govern all work under this section.

QUALITY CONTROL

Obtain elastomeric materials from only manufacturers who will, if requested, send a qualified technical representative to advise the installer of proper procedures and precautions for the use of materials.

Employ only skilled tradesmen for the work.

SUBMITTALS

Submit manufacturer's specifications, recommendations and installation instructions for each type of sealant, caulking compound and associated miscellaneous material required in accordance with Division 1. Include manufacturer's published data, or letter of certification or certified test laboratory report indicating that each material complies with the requirements and is intended generally for the applications shown.

Furnish actual material color samples; color shall be selected from manufacturer's colors.

PART 2 PRODUCTS

CAULKING - GENERAL BUILDING

Interior: acrylic terpolymer, solvent based, one part, thermo-plastic sealant compound, solids not less than 95% acrylic; complying with ASTM C920, Type S, Grade NS; recommended by manufacturer for general use as an exposed building construction sealant. Furnish Tremco Mono, Pecora 60 Unicrylic, DAP Acrylic, or approved equal.

Exterior: Urethane, one part, air curing, elastomeric sealant, complying with ASTM C920, Type S, Grade NS, Class 25; Tremco Dymonic, Pecora Dynatrol I, Sika Sikaflex 1A, Sonoborn Sonolastic NP1, or approved equal.

At contractor's option, one part primerless, silicone construction sealant complying with ASTM C920, Type S, Grade NS, Class 25, may be used in lieu of the above; GE Silpruf, Dow Corning 790, Pecora 864, or approved equal.

JOINT CLEANER

Provide type of joint cleaner recommended by sealant manufacturer for the particular joint sealant.

JOINT PRIMER/SEALER

Provide the type of joint primer/sealer recommended by the sealant manufacturer, for the joint surfaces to be primed or sealed.

BOND BREAKER TAPE

Polyethylene tape or other plastic tape as recommended by sealant manufacturer, to be applied to sealant contact surfaces where bond to the substrate or joint filler must be avoided for performance of sealant. Provide self adhesive tape wherever applicable.

SEALANT BACKER ROD

Compressible closed cell rod stock of polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent durable non-absorptive material as recommended

for compatibility with sealant by the sealant manufacturer. Provide size and shape of rod which will control the joint depth for sealant placement, break bond of sealant at bottom of joint, form optimum shape of sealant bead on back side, and provide a highly compressible backer to minimize the possibility of sealant extrusion when joint is compressed.

PART 3 EXECUTION

PREPARATION

Examine joint surfaces, backing and anchorage of units forming sealant rabbet, and conditions under which the sealant work is to be performed, and notify of conditions detrimental to the proper and timely completion of the work and performance of the sealant. Do not proceed with the sealant work until unsatisfactory conditions have been corrected.

WEATHER CONDITIONS

Do not proceed with installation of sealant under adverse weather conditions, or when temperatures are below or above the manufacturer's recommended limitations for installation. Proceed with the work only when forecasted weather conditions are favorable for proper cure and development of high early bond strength. Wherever joint width is affected by ambient temperature variations, install elastomeric sealant only when temperatures are in the lower third of manufacturer's recommended installation temperature range, so that sealant will not be subjected to excessive elongation and bond stress at subsequent low temperatures.

JOINT SURFACE PREPARATION

Clean joint surfaces immediately before installation of sealant or caulking compound. Remove dirt, insecure coatings, moisture and other substances, which would interfere with bond of sealant or caulking compound.

Etch concrete and masonry joint surfaces to remove excess alkalinity, unless sealant manufacturer's printed instructions indicate that alkalinity does not interfere with sealant bond and performance. Etch with 5% solution of muriatic acid; neutralize with dilute ammonia solution, rinse thoroughly with water and allow to dry before sealant installation.

Roughen joint surfaces on vitreous coated and similar non-porous materials, wherever sealant manufacturer's data indicates lower bond strength than for porous surfaces. Rub with fine abrasive cloth or wool to produce a dull sheen.

INSTALLATION

Comply with sealant manufacturer's printed instructions except where more stringent requirements are shown or specified and except where manufacturer's technical representative directs otherwise. Prime or seal the joint surfaces wherever shown or recommended by the sealant manufacturer. Do not allow primer/sealer to spill or migrate on to adjoining surfaces.

Install sealant backer rod for liquid elastomeric sealant, except where shown to be omitted or recommended to be omitted by sealant manufacturer for the application shown.

Employ only proven installation techniques, which will ensure that sealant will be deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of the joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.

Install sealants to depths as shown, or if not shown, as recommended by the sealant manufacturer but within the following general limitations, measured at the center (thin) section of bead.

For normal moving joints sealed with elastomeric sealant, but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 1/2" deep not less than 1/4" deep.

For joints sealed with non-elastomeric sealant and caulking compounds, fill joints to a depth in the range of 75% to 125% of joint width.

Do not allow sealant or compound to overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces including rough textures such as exposed aggregate panels. Use masking tape or other devices to prevent staining of adjoining surfaces, by either the primer/sealer or the sealant/caulking compound.

Remove excess and spillage of compounds promptly s the work progresses. Clean the adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage, without damage to the adjoining surfaces or finishes.

CURING

Cure sealant and caulking compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.

Protect sealant and caulking compounds during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at the time acceptance.

END OF SECTION

Page Intentionally Left Blank

SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

RELATED DOCUMENTS
Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

SUMMARY
Section includes:
- Interior standard steel doors and frames.
- Exterior standard steel doors and frames.

ACTION SUBMITTALS
Product Data: For each type of product.

Shop Drawings: Include the following:

- Elevations of each door type.
- Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
- Frame details for each frame type, including dimensioned profiles and metal thicknesses.

Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

INFORMATIONAL SUBMITTALS
Product test reports.

PART 2 – PRODUCTS

INTERIOR STANDARD STEEL DOORS AND FRAMES
Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

Standard-Duty Frames: SDI A250.8, Level 1; SDI A250.4, Level C. At locations indicated in the Frame Schedule.

Doors:

- Type: As indicated in the Door and Frame Schedule.
- Thickness: 1-3/4 inches.
- Face: Uncoated steel sheet, minimum thickness of 0.032 inch.
- Edge Construction: Model 1, Full Flush.
- Core: Manufacturer's standard.

Frames:

- Materials: Uncoated steel sheet, minimum thickness of 0.042 inch.
- Construction: Full profile welded.

EXTERIOR STANDARD STEEL DOORS AND FRAMES
Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

Heavy-Duty Doors and Frames: SDI A250.8, Level 2; SDI A250.4, Level B. At locations indicated in the Door and Frame Schedule.

Doors:

Type: As indicated in the Door and Frame Schedule.
Thickness: 1-3/4 inches.
Face: Metallic-coated steel sheet, minimum thickness of 0.042 inch, with minimum A40 coating.
Edge Construction: Model 1, Full Flush.
Edge Bevel: Provide manufacturer's standard beveled or square edges.
Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
Bottom Edges: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
Core: Manufacturer's standard Polystyrene insulation.

Frames:

Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.
Construction: Full profile welded.

FRAME ANCHORS

Jamb Anchors:

Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
Postinstalled Expansion Anchor: Minimum 3/8-inch-diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.

Material: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M; hot-dip galvanized according to ASTM A 153/A 153M, Class B.

MATERIALS

Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

Glazing: Comply with requirements in Section 08 80 00 "Glazing."

FABRICATION

Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.

Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

Single-Door Frames: Drill stop in strike jamb to receive three door silencers.

Double-Door Frames: Drill stop in head jamb to receive two door silencers.

Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.

Provide stops and moldings flush with face of door, and with beveled stops unless otherwise indicated.

Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.

Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

STEEL FINISHES

Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

PREPARATION

Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

INSTALLATION

Hollow-Metal Frames: Comply with SDI A250.11 NAAMM-HMMA 840.

Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.

Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.

Install frames with removable stops located on secure side of opening.

Floor Anchors: Secure with postinstalled expansion anchors.

Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

Solidly pack mineral-fiber insulation inside frames.

Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.

In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

Installation Tolerances: Adjust hollow-metal frames to the following tolerances:

Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.

Non-Fire-Rated Steel Doors: Comply with SDI A250.8 NAAMM-HMMA 841 and NAAMM-HMMA guide specification indicated.

Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.

CLEANING AND TOUCHUP

Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION

Page Intentionally Left Blank

SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 - GENERAL

SUMMARY
Section Includes:
Solid-core doors with wood-veneer.

Related Requirements:
Section 08 11 13 “Hollow Metal Doors & Frames” for frames.
Section 08 80 00 "Glazing" for glass view panels in flush wood doors.

ACTION SUBMITTALS
Product Data: For each type of door. Include factory-finishing specifications.

Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
Dimensions and locations of blocking.
Dimensions and locations of mortises and holes for hardware.
Dimensions and locations of cutouts.
Undercuts.
Requirements for veneer matching.
Doors to be factory finished and finish requirements.

Samples: For plastic-laminate door faces and factory-finished doors.

INFORMATIONAL SUBMITTALS
Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

DELIVERY AND STORAGE
Protect wood doors during transit, handling and storage to prevent damage, soiling and deterioration. Store in a dry location and stack in accordance with manufacturer's instructions. The installer shall advise the Contractor of proper procedure required for protection of installed wood doors from damage or deterioration until acceptance of the work.

WARRANTY
Submit two (2) copies of written agreement in door manufacturer's standard form signed by the Manufacturer, Installer, and Contractor, agreeing to repair or replace any defective doors which have warped (bow, cup or twist) or which show photographing of construction below in face veneers, as defined in NWMA Standard Door Guarantee, except the NWMA provision for refunding the price received by the door manufacturer for any defective door shall not apply. The guarantee shall also include refinishing and reinstallation which may be required due to repair or replacement of defective doors. Guarantee shall be in effect during the following period of time after the date of acceptance.

Warranty doors for one (1) year after date of substantial completion.

PART 2 - PRODUCTS

FLUSH WOOD DOORS, GENERAL
Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards and WDMA I.S.1-A, "Architectural Wood Flush Doors."

Provide AWI Quality Certification Labels indicating that doors comply with requirements of grades specified.

WDMA I.S.1-A Performance Grade:

Heavy Duty unless otherwise indicated.

Structural-Composite-Lumber-Core Doors:

Structural Composite Lumber: WDMA I.S.10.

Screw Withdrawal, Face: 700 lbf.
Screw Withdrawal, Edge: 400 lbf.

VENEER-FACED DOORS FOR TRANSPARENT FINISH

Interior Solid-Core Doors:

Grade: Custom (Grade A faces).
Species: Red oak.
Cut: Plain sliced (flat sliced).
Match between Veneer Leaves: Book match.
Assembly of Veneer Leaves on Door Faces: Balance match.
Core: Particleboard.
Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.

LIGHT FRAMES AND LOUVERS

Metal Frames for Light Openings in Doors: Manufacturer's standard frame formed of 0.048-inch-thick, cold-rolled steel sheet; with baked-enamel- or powder-coated finish.

FABRICATION

Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

Factory machine doors for hardware that is not surface applied.

Openings: Factory cut and trim openings through doors.

Light Openings: Trim openings with moldings of material and profile indicated.
Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 08 80 00 "Glazing."

FACTORY FINISHING

General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.

Factory finish doors that are indicated to receive transparent finish.

Transparent Finish:

Grade: Custom.
Finish: AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" System 10, UV curable, water based.
Staining: As selected by Architect from manufacturer's full range.
Effect: Filled finish.
Sheen: Satin.

PART 3 - EXECUTION

INSTALLATION

Hardware: For installation, see Section 08 71 00 "Door Hardware."

Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.

Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.

END OF SECTION

Page Intentionally Left Blank

Section 08 14 23
Ultimate Commercial Door

PART 1 GENERAL

1.1 Section Includes

A. Ultimate Commercial Door and Frame, complete with hardware, glazing, weather strip, simulated divided lite, stationary sidelite, stationary transom, jamb extension, and standard or specified anchors, trim and attachments.

1.2 Related Sections

A. Section 01 31 00 – Submittal Procedures: Shop Drawings, Product Data and Samples
B. Section 01 74 00 – Cleaning and Waste Management
C. Section 01 77 00 – Starting and Adjusting
D. Section 01 77 00 – Protecting Installed Construction
E. Section 06 20 23 – Millwork: Wood trim other than furnished by door and frame manufacturer
F. Section 07 90 00 – Joint Sealants: Sill sealant and perimeter caulking
G. Section 08 71 00 – Door Hardware: Hardware other than furnished by door and frame manufacturer
H. Section 09 90 00 – Paints and Coatings: Paint or stain other than factory applied finish

1.3 References

A. WDMA I.S.4: Industry Standard for Water Repellent Preservative Treatment Millwork
B. Sealed Insulating Glass Manufactures Association / Insulating Glass Certification Council (SIGMA/IGCC)
C. American Architectural Manufacturers Association (AAMA): 2605: Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
D. American Society for Testing and Materials (ASTM): E330: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

1.4 System Description

A. Design and Performance Requirement. Design Pressure is applicable to individual units and may vary with unit size. (2 ¼" Door only)
   1. Units shall be designed to comply with ASTM E330 for structural performance. SHED DP +40/-40 psf (with removable mullion rim device & vertical locking rods) and SHED DP +25/-25 psf (with removable mullion and rim device)

1.5 Submittals

A. Shop Drawings: Submit shop drawings under provision of Section 01 31 00
B. Product Data: Submit catalog data under provision of Section 01 31 00
C. Samples:
   1. Submit corner section under provision of section 01 31 00
   2. Include glazing system, quality of construction and specified finish

1.6 Quality Assurance

A. Requirements: consult local code for IBC [International Building Code] adoption year and pertinent revisions

1.7 Delivery

A. Comply with provisions of Section 01 65 00
B. Deliver in original and protect from weather

1.8 Storage and Handling

A. Prime and seal wood surfaces, including to be concealed by wall construction, if more than thirty (30) days will expire between delivery and installation
B. Store door panels flat on a level surface in a clean and dry storage area above ground to protect from weather under provision of Section 01660
C. Condition doors to local average humidity before hanging

1.9 Warranty

Complete and current warranty information is available at **marvin.com/warranty**. The following summary is subject to the terms, condition, limitations and exclusions set forth in the Marvin Limited Warranty and Products in Coastal Environments Limited Warranty Supplement:

A. Clear insulating glass with stainless steel spacers is warranted against seal failure caused by manufacturing defects and resulting in visible obstruction through the glass for twenty (20) years from the original date of purchase. Glass is warranted against stress cracks caused by manufacturing defects from (10) years from the original date of purchase.
B. Standard exterior aluminum cladding finish is warranted against manufacturing defects resulting in chalk, fade and loss of adhesion (peel) per the American Manufacture's Association's (AAMA) Specification 2605-11 Section 8.4 and 8.9 for twenty (20) years from the original date of purchase.
C. Factory applied interior finish is warranted to be free from the Finish Defects for a period of five (5) years from the original date of purchase.
D. Hardware and other non-glass components are warranted to be free from manufacturing defects for ten (10) years from the original date of purchase.

PART 2 PRODUCTS

2.1 Manufactured Units

A. Description: Factory assembled Ultimate Commercial Door, as manufactured by Marvin, Ripley, Tennessee.

2.2 Frame Description

A. Finger-Jointed, edge-glued Pine core with non finger-jointed Pine veneer; finger-jointed, edge-glued White Oak core with non finger-jointed White Oak veneer; finger-jointed, edge-glued Cherry core with non finger-jointed Cherry veneer; finger-jointed, edge-glued Mahogany core with non finger-jointed Mahogany veneer; finger-jointed, edge-glued Vertical Grain Douglas Fir core with non finger-jointed Vertical Grain Douglas Fir veneer, edge-glued Mixed Grain Douglas Fir veneer with non finger-jointed Mixed Grain Douglas Fir
   1. Kiln dried to moisture content no greater than twelve (12) percent at the time of fabrication
   2. Water repellent, preservative treated in accordance with WDMA I.S.4.
B. Frame width: 4 9/16" (116mm)
C. Frame thickness: 1 1/16" (27mm)
D. Exterior extruded aluminum clad 0.050" (1.3mm) thick
E. Sill Options:
   1. Standard factory installed thermal barrier saddle low profile .500" (13mm) by 7.125" (181mm) sill. Optional thermal barrier saddle low profile .250" (6mm) by 7.125" (181mm) sill. Offset saddle low profile 0.500" (13mm) by 7.00" (178mm) sill with 0.250" (6mm) offset.
   2. Optional factory-installed thermal barrier saddle low profile 0.500" (13mm) by 8.125" (210mm). Optional thermal barrier saddle low profile 0.250" (6mm) by 8.125" (210mm) sill.
   3. Optional factory-installed thermal barrier saddle low profile 0.500" (13mm) by 9.125" (235mm). Optional thermal barrier saddle low profile 0.250" (6mm) by 9.125" (235mm) sill.

2.3 Glazing

A. Select quality complying with ASTM C1036. Comply with 16 CFR 1201 Safety Standard for Architectural Glazing Materials. Tempered insulating glass IGMA/IGCC certified to performance level CBA when tested in accordance with ASTM E774.
B. Glazing Method: Tempered Insulating Glass (Altitude Adjusted)
C. Glass Type: Gray, Low E2 with Argon,
D. Glazing Seal: Silicone bedding, exterior

2.4 Finish

A. Exterior: Aluminum clad. Fluoropolymer modified acrylic topcoat applied over primer. Meets AAMA 2605 requirements.
   1. Standard Colors: Bahama Brown, Bronze, Cadet Gray, Cascade Blue, Cashmere, Clay, Coconut Cream, Ebony, Evergreen, Gunmetal, Hampton Sage, Pebble Gray, Sierra White, Stone White, Suede, Wineberry, Bright Silver (pearlescent), Copper (pearlescent), Liberty Bronze (pearlescent)
B. Interior Finish Options:

2. Factory applied water borne stain. Stain applied over a wood (stain) conditioner. A water-borne acrylic enamel clear coat applied in two separate coats, with light sanding between coats, applied over the stain. Available on Pine, Mahogany, Mixed Grain Douglas Fir, Vertical Grain Douglas Fir, Cherry, White Oak. Colors available: Wheat, Honey, Hazelnut, Leather, Cabernet, or Espresso. Meets WDMA TM-14 requirements.

2.5 Hardware

A. Hinges: 4 ½" x 4 ½" square corner ball bearing hinges.
   1. Finish: Satin Chrome (US26D) over brass substrate, Bronze (US10A) over brass substrate, Brass (US3), Stainless Steel (US32D).
B. Locking System:
   1. Optional Commercial Hardware Package: closer, rim device, and kick plate
C. Optional hardware Routs and Preps.
   1. Von Duprin Cross Bar Device and Trim Sets

2.6 Weather Strip

A. Head jamb and hinge jamb: bulb type weather strip.
   1. Color: black
B. Locking jamb: Gray pile weather strip
C. Surface mounted aluminum panel drip mounted at bottom of panel (shipped loose for field application)
   1. Standard colors: Matches panel finish with matching screws

2.7 Jamb Extension

A. Factory installed (loose), for wall thickness indicated or required.
B. Finish: Match interior frame wood species and finish.

2.8 Accessories and Trim

A. Installation and hardware Accessories:
   1. Factory installed vinyl nailing fin/drip cap
   2. Installation brackets: 6 3/8" (162mm); 9 3/8" (238mm); 15 3/8" (390mm)
   3. Masonry brackets: 6" (152mm); 10" (254mm)
B. Aluminum Extrusions:
   1. Profile: Brick Mould Casing; Flat Casing; Mullion Cover; Custom Profiles as indicated on drawings
   2. Finish: Fluoropolymer modified acrylic topcoat applied over primer. Meets AAMA 2605 requirements. Available in all aluminum clad colors. Contact your Marvin representative for custom colors.

PART 3 EXECUTION

3.1 Examination

A. Verification of Condition: Before installation, verify openings are plumb, square and of proper dimensions as required in Section 01 71 00. Report frame defects or unsuitable conditions to the General contractor before proceeding.
B. Acceptance of Condition: Beginning on installation confirms acceptance of existing conditions.

3.2 Installation

A. Comply with Section 01 73 19.
B. Assemble and install window/door unit(s) according to manufacturer's instruction and reviewed shop drawing.
C. Install sealant and related backing materials at perimeter of unit or assembly in accordance with Section 07 92 00 Joint Sealants. Do not use expansive foam sealant.
D. Install accessory items as required.
E. Use finish nails to apply wood trim and mouldings.

3.3 Field Quality Control

A. Remove visible labels and adhesive residue according to manufacturer's instruction.

B. Unless otherwise specified, air leakage resistance tests shall be conducted at a uniform static pressure of 75 Pa (~1.57 psf). The maximum allowable rate of air leakage shall not exceed 2.3 L/sm^2 (~0.45 cfm/ft^2).

C. Unless otherwise specified, water penetration resistance testing shall be conducted per AAMA 502 and ASTM E1105 at 2/3 of the fenestration products design pressure (DP) rating using "Procedure B" – cyclic static air pressure difference. Water penetration shall be defined in accordance with the test method(s) applied.

3.4 Cleaning

A. Remove visible labels and adhesive residue according to manufacturer's instruction.

B. Leave windows and glass in a clean condition. Final cleaning as required in Section 01 74 00.

3.5 Protecting Installed Construction

A. Comply with Section 01 76 00.

B. Protecting windows from damage by chemicals, solvents, paint or other construction operations that may cause damage.

END OF SECTION

SECTION 08 16 73
FIBERGLASS MULTISLIDE DOOR

PART 1 GENERAL

SECTION INCLUDES:

High-Density Fiberglass MultiSlide Door complete with frame, panels, glazing and operating hardware.

RELATED SECTIONS

01 31 00: Project management and Coordination
01 77 00: Closeout Procedures
07 90 00: Joint Protection

REFERENCES

ASTM International (ASTM):

C1036: Standard Specification for Flat Glass
C1048: Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass
C1376: Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass
E1105: Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference
E1300: Standard Practice for Determining Load Resistance of Glass in Buildings
E2190: Standard Specification for Insulating Glass Unit Performance and Evaluation
E283: Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
E547: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference

Architectural Aluminum Manufacturer's Association/Window and Door Manufacturer's Association/Canadian Standards Association (AAMA/WDMA/CSA):

101/I.S.2/A440: North American Fenestration Standard (NAFS)/Specification for Windows, Doors and Skylights

Window and Door Manufacturer's Association (WDMA):

101/I.S.2 WDMA Hallmark Certification Program

Insulating Glass Manufacturer's Association/Insulating Glass Certification Council (IGMA/IGCC)

Architectural Aluminum Manufacturer's Association (AAMA):

2605: Voluntary specification, performance requirements and test procedures for superior performing organic coatings on aluminum extrusions and panels
502: Air and Water Leakage Resistance testing of Installed Windows and Doors
611: Voluntary Specification for Anodized Architecturally Finished Aluminum
625: Voluntary Specification, Performance Requirements and Test Procedures for Superior Performance Organic Coatings on Fiber Reinforced Thermoset Profiles

National Fenestration Rating Council (NFRC):

101: Procedure for Determining Fenestration Product Thermal Properties
200: Procedure for Determining Solar Heat Gain Coefficients at Normal Incidence

SUBMITTALS

Submit Shop Drawings, Product Data and Samples per Section 01 31 00

Submit Quality Control Certificates indicating performance compliance per Section 01 31 00

QUALITY ASSURANCE

Requirements: Consult local code for International Building Code (IBC) and International Residential Code (IRC) adoption year and pertinent revisions

Performance Grade as certified by AAMA/WDMA/CSA 101/I.S.2/A400

Bi-Parting Units:

LC-PG40-SD: Panels widths up to 5’-0” (1524 mm)

Bi-Parting Stacked with Performance sill, up to 10 panels

Maximum frame size of 48’-4 ½” (14745 mm) by 10’-0” (3048 mm), tested to 1.57 psf Air, 6 psf Water, +/- 40 psf Structural, with tempered glass

NFRC Certified U-Value:

Gateway tested frame size of 6’-7” (2007 mm) by 6’-7” (2007 mm)

Forced Entry Resistance: Grade 10

Break-away Force: 18 to 30 lbs

Operating Force: 13 to 16 lbs

DELIVERY, STORAGE, AND HANDLING

Comply delivery, storage and handling per Section 01 65 00

Deliver in original packaging and protect from weather

Store window units in an upright position in a clean and dry storage area above ground to protect from weather under provision of Section 01 66 00

PROJECT CONDITIONS

Maintain environmental conditions (temperature, humidity, and ventilation) within the limits recommended by the manufacture for optimum results. Do not install products under environmental conditions outside of manufacture’s recommended limits

WARRANTY

Complete and current warranty information is available at www.marvin.com/warranty (effective 10/29/2018). The following summary is subject to the terms, condition, limitations and exclusions set forth in the Marvin Windows and Door Limited Warranty and Products in Coastal Environments Limited Warranty Supplement:

Glass Components:

Glass warranties apply to factory-installed glass or Marvin supplied glass installed by Marvin-authorized service personnel. Standard insulating glass with stainless steel spacers is warranted against seal failure caused by manufacturing defects and resulting in visible obstruction through the glass for twenty (20) years in sizes up to sixty (60) square feet, and for ten (10) years in sizes sixty (60) square feet and larger. Non-tempered glass is warranted against stress cracks caused by manufacturing defects for ten (10) years. All other glass and glass features are provided with the same warranties, limitations, and exclusions Marvin receives from its supplier; contact Marvin for further details

Exterior Finish:

Marvin’s standard exterior composite cladding finish is warranted against manufacturing defects per AAMA 625, Section 5, for ten (10) years

Interior Finish:

Factory applied interior aluminum finish is warranted against manufacturing defects per AAMA 2605, Sections 8.4 and 8.9 for twenty (20) years. Anodized interior aluminum finish

is warranted to be free from manufacturing defects for five (5) years

Non-Glass Components:

Hardware and other non-glass components are warranted to be free from manufacturing defects for ten (10) years. Stainless steel hardware and hardware with PVD finishes installed in coastal environments are warranted to be free from manufacturing defects that result in abnormal deterioration of the finish for a period of ten (10) years. Other hardware finishes are not warranted in coastal environments. Electric operators and other motorized accessories are provided with the same warranties, limitations, and exclusions Marvin receives from its supplier; contact Marvin for further details

PART 2 PRODUCTS

MANUFACTURERS

Acceptable Manufacturer: Marvin Windows and Doors, States Avenue, Warroad, Minnesota 56763, 218-386-1430, www.marvin.com

FABRICATION

Frame:

Exterior: High-Density Fiberglass
Interior: Extruded Aluminum
Thickness: 1-1/2” (38 mm)
Depth: 3-1/64” (77 mm) per track

Sill:

High-Density Fiberglass and Extruded Aluminum in Ebony
Track components interlock and include drainage routes with weeps to the exterior
Exterior weeps must remain un-obstructed
Panning/s required and supplied by others
Flush sill with overall height of 3/4" (19 mm)
Performance sill with overall height of 1-13/16” (46 mm)
High Performance sill with exterior sill liner and overall height of 1-53/64” (21 mm) to be recessed. Sill is ADA capable when installed level with the top of the sill and interior and exterior transition surfaces
Composite sloped wedge interlock and span the sill length
Composite counter shims to level sill surface and are placed 10” (254 mm) on center along the sill length

Panel:

Exterior: High-Density Fiberglass
Interior: Extruded Aluminum
Thickness: 2-1/4” (70 mm)
Top rail height: 3-25/32” (96 mm) with visible face of 2-7/8” (73 mm)
Bottom rail height: 3-9/32” (88 mm) with visible face of 2-7/8” (73 mm)
Locking Stile width: 3-9/32” (88 mm) with visible face of 2-7/8” (73 mm) when closed
Meeting Stile Width: 2-7/8” (73 mm)
Panel bumpers: Bracket color to match interior aluminum with black rubber stopper

Glazing:

Dual-Pane insulating tempered one lite glass with preserve film on interior and exterior panes
Insulating glass per ASTM E2190
Glass thickness shall be sized to rated design pressure per ASTM E-1300
Safety glazing per CPSC 16 CFR 1201, SGCC, & CAN/CGSB
Configurations:

Dual-Pane insulating glass
15/16” (24mm) Overall thickness
Surface Treatment:
Low E Coating: Gray Tint/Low E2
Gas Fill:
Argon
Perimeter spacer material:
Black painted Aluminum
Seal: Black silicone sealant
Finish:
Interior Frame and Panels/Exterior Covers:
Painted extruded aluminum covers with 70% PVDF top coat applied to meet AAMA 2605 requirements in Ebony.
Anodize extruded aluminum covers meeting Class 1, AAMA 611 requirements in Clear Anodize
Exterior Frame and Panels:
High-Density Fiberglass coated with a PVDF Fluoropolymer FEVE (fluoroethylene vinyl ether) resin with ceramic pigments designed to meet AAMA 625 requirements in Ebony
Configuration:
Bi-Parting Stacked
Hardware:
Multipoint lock: Two locking point engage and disengage with keeper
Handle Set: Flush mounted handles with recessed pull and thumb latch engage and disengage panel locking points as Keyed alike
Interior Finish: Matte Black
Exterior Finish: Matte Black
Finger Pull: Pocket panel only. Recessed at panel edge for to access pocketed configuration panel, finish is Satin Chrome
In-Active lock: Bi-Parting configurations only Lever lock engages top and bottom bolts on in-active panel edge, lever color is black
Roller wheels: Two quad rollers per panel capable to 792 lbs. Encased in stainless steel housing, with composite wheels and stainless steel bearings. End adjustable up to 7/32” (6 mm)
Weather Strip:
Color: Black
Interlock:
Color: Black
End adjustment covers:
Rectangular aluminum covers at bottom edge of panel conceals roller adjustment access
Finish matches interior aluminum
Sizes and Configurations:
Bi-Parting units
Stacked configurations from 2 to 10 total panels:
Maximum Panel Size:
6'-1 3/8" (1839 mm) by 11'-10 1/8" (3610 mm)
Maximum Frame Size: 58'-4 1/2" (17793 mm) by 12’-0” (3658 mm)
8'-0 3/8" (2448 mm) by 9'-10 1/8" (3001 mm), applicable to OX-XO, OXX-XXO configurations only
Maximum Frame Size: 47'-4"” (14427 mm) by 10’-0” (3048 mm)

PART 3 EXECUTION

EXAMINATION AND PREPARATION

Verification of Condition:

Before installation, verify openings are plumb, square and of proper dimensions as required in Section 01 71 00

Report frame defects or unsuitable conditions to the General contractor before proceeding

Acceptance of Condition:

Beginning of installation confirms acceptance of existing conditions

INSTALLATION

Assemble and install window/door unit(s) per manufacturer's instruction and reviewed shop drawing

Installation to comply with Section 01 73 19

Install sealant and related backing materials at perimeter of unit or assembly in accordance with Section 07 92 00. Do not use expansive foam sealant

Install accessory items as required

FIELD QUALITY CONTROL

Unless otherwise specified, air leakage resistance tests shall be conducted at a uniform static pressure of 75 Pa (~1.57 psf). The maximum allowable rate of air leakage shall not exceed 2.3 L/sm2 (~0.45 cfm/ft2)

Unless otherwise specified, water penetration resistance testing shall be conducted per AAMA 502 and ASTM E1105 at 2/3 of the fenestration products design pressure (DP) rating using "Procedure B" – cyclic static air pressure difference. Water penetration shall be defined in accordance with the test method(s) applied

CLEANING AND PROTECTION

Protect installed construction as required in Section 01 76 00

Remove visible labels and adhesive residue per manufacturer's instruction

Leave windows and glass in a clean condition, final cleaning as required in Section 01 74 23

Protecting windows from damage by chemicals, solvents, paint or other construction operations that may cause damage

END OF SECTION

Page Intentionally Left Blank

SECTION 08 41 13
ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS/CURTAINWALL

PART 1 - GENERAL

SUMMARY
Section Includes:
- Storefront framing.
- Curtainwall framing.
- Manual-swing entrance doors.

PREINSTALLATION MEETINGS
Pre-installation Conference: Conduct conference at Project site.

ACTION SUBMITTALS
Product Data: For each type of product.

Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.

- Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
- Include point-to-point wiring diagrams.

Samples: For each type of exposed finish required.

Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.

Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

INFORMATIONAL SUBMITTALS
Energy Performance Certificates: NFRC-certified energy performance values from manufacturer.

Product test reports.
Source quality-control reports.
Field quality-control reports.
Sample warranties.

CLOSEOUT SUBMITTALS
Maintenance data.

QUALITY ASSURANCE
Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.

Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

WARRANTY

Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

Warranty Period: Two years from date of Substantial Completion.

Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.

Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS

General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.

Failure also includes the following:

Thermal stresses transferring to building structure.
Glass breakage.
Noise or vibration created by wind and thermal and structural movements.
Loosening or weakening of fasteners, attachments, and other components.
Failure of operating units.

Structural Loads:

Wind Loads: As indicated on Drawings.

Other Design Loads: As indicated on Drawings.

Deflection of Framing Members: At design wind pressure, as follows:

Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding 1/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.

Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch.

Cantilever Deflection: Where framing members overhang an anchor point, as follows:

Perpendicular to Plane of Wall: No greater than 1/240 of clear span plus 1/4 inch for spans greater than 11 feet 8-1/4 inches or 1/175 times span, for spans of less than 11 feet 8-1/4 inches.

Structural: Test according to ASTM E 330/E 330M as follows:

When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance doors, do not evidence deflection exceeding specified limits.

When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including entrance doors and anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.

Test Durations: As required by design wind velocity, but not less than 10 seconds.

Air Infiltration: Test according to ASTM E 283 for infiltration as follows:

Fixed Framing and Glass Area:

Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft..

Entrance Doors:

Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..

Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:

No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft..

Energy Performance: Certify and label energy performance according to NFRC as follows:

Thermal Transmittance (U-factor): Fixed glazing and framing areas as a system shall have U-factor of not more than 0.45 Btu/sq. ft. x h x deg F as determined according to NFRC 100.

Solar Heat Gain Coefficient (SHGC): Fixed glazing and framing areas as a system shall have SHGC of no greater than 0.26 as determined according to NFRC 200.

Windborne-Debris Impact Resistance: Pass missile-impact and cyclic-pressure tests according to ASTM E 1996 for Wind Zone 1.

Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.

Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

STOREFRONT SYSTEMS

Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

Exterior Framing Construction: Thermally broken.

Glazing System: Retained mechanically with gaskets on four sides.

Finish: Color anodic finish.

Fabrication Method: Field-fabricated stick system.

Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

Steel Reinforcement: As required by manufacturer.

Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

GLAZED ALUMINUM CURTAIN WALL SYSTEMS

Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

Construction: Thermally broken.
Glazing System: Retained mechanically with gaskets on four sides.
Glazing Plane: Front.
Finish: Color anodic finish.
Fabrication Method: Either factory- or field-fabricated system.
Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
Steel Reinforcement: As required by manufacturer.

Pressure Caps: Manufacturer's standard aluminum components that mechanically retain glazing.

Include snap-on aluminum trim that conceals fasteners.

Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

GLAZING

Glazing: Comply with Section 08 80 00 "Glazing."

Glazing Gaskets: ASTM C509 or ASTM C864. Manufacturer's standard.

Color: Black.

Glazing Sealants: As recommended by manufacturer.

ENTRANCE DOOR SYSTEMS

Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.

Door Construction: 2-inch overall thickness, with minimum 0.188-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.

Door Design: As indicated on drawings.
Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.

Provide nonremovable glazing stops on outside of door.

ENTRANCE DOOR HARDWARE

Entrance Door Hardware: Hardware not specified in this Section is specified in Section 08 71 00 "Door Hardware."

GLAZING

Glazing: Comply with Section 08 80 00 "Glazing."

Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

Glazing Sealants: As recommended by manufacturer.

MATERIALS

Sheet and Plate: ASTM B 209.

Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.

Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.

Structural Profiles: ASTM B 308/B 308M.

Steel Reinforcement:

Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.
Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.

FABRICATION
Form or extrude aluminum shapes before finishing.

Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

Fabricate components that, when assembled, have the following characteristics:

Profiles that are sharp, straight, and free of defects or deformations.
Accurately fitted joints with ends coped or mitered.
Physical and thermal isolation of glazing from framing members.
Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
Provisions for field replacement of glazing from interior.
Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

Entrance Doors: Reinforce doors as required for installing entrance door hardware.

Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

ALUMINUM FINISHES
Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.

Color: As selected by Architect from full range of industry colors and color densities.

PART 3 - EXECUTION

INSTALLATION
General:

Comply with manufacturer's written instructions.

Do not install damaged components.
Fit joints to produce hairline joints free of burrs and distortion.
Rigidly secure nonmovement joints.
Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
Seal perimeter and other joints watertight unless otherwise indicated.

Metal Protection:

Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

Set continuous sill members and flashing in full sealant bed, as specified in Section 07 92 00 "Joint Sealants," to produce weathertight installation.

Install components plumb and true in alignment with established lines and grades.

Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

Install glazing as specified in Section 08 80 00 "Glazing."

Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

FIELD QUALITY CONTROL

Testing Agency: Engage a qualified testing agency to perform tests and inspections.

Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed entrances and storefronts.

Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.

Perform a minimum of two tests in areas as directed by Architect.

Air Infiltration: ASTM E 783 at 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article but not more than 0.09 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..

Perform a minimum of two tests in areas as directed by Architect.

Water Penetration: ASTM E 1105 at a minimum uniform and cyclic static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft., and shall not evidence water penetration.

Aluminum-framed entrances and storefronts will be considered defective if they do not pass tests and inspections.

Prepare test and inspection reports.

END OF SECTION

Page Intentionally Left Blank

SECTION 08 71 00
DOOR HARDWARE

PART 1 - GENERAL

SUMMARY
Section Includes:
Mechanical door hardware for the following:
Swinging doors.

ACTION SUBMITTALS
Product Data: For each type of product.

Samples: For each exposed product in each finish specified.

Door hardware schedule.
Keying schedule.

INFORMATIONAL SUBMITTALS
Sample warranty.

CLOSEOUT SUBMITTALS
Maintenance data.

QUALITY ASSURANCE
Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.

Scheduling Responsibility: Preparation of door hardware and keying schedule.
Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as an Architectural Hardware Consultant (AHC).

WARRANTY
Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
Accessibility Requirements: For door hardware on doors in an accessible route, comply with the DOJ's "2010 ADA Standards for Accessible Design", ICC A117.1, and HUD's "Fair Housing Accessibility Guidelines".

SCHEDULED DOOR HARDWARE

Provide products for each door that comply with requirements indicated in Part 2 and door hardware schedule.

Door hardware is scheduled in Part 3.

HINGES

Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

CONTINUOUS HINGES

Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.

MECHANICAL LOCKS AND LATCHES

Lock Functions: As indicated in door hardware schedule.

Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

Bored Locks: Minimum 1/2-inch latchbolt throw.
Mortise Locks: Minimum 3/4-inch latchbolt throw.
Deadbolts: Minimum 1-inch bolt throw.

Lock Backset: 2-3/4 inches unless otherwise indicated.

Lock Trim:

Levers: Cast.
Escutcheons (Roses): Cast.
Dummy Trim: Match lever lock trim and escutcheons.

Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.

Bored Locks: BHMA A156.2; Grade 1; Series 4000.

LOCK CYLINDERS

Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

Standard Lock Cylinders: BHMA A156.5; Grade 1 permanent cores; face finished to match lockset.

Core Type: Interchangeable Removable.

Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.

Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

KEYING

Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock. Hardware supplier shall meet with Owner to develop a keying schedule.

No Master Key System: Only change keys operate cylinders.

Provide three cylinder change keys.

Keys: Nickel silver.

Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

Notation: "DO NOT DUPLICATE."

OPERATING TRIM

Operating Trim: BHMA A156.6; aluminum unless otherwise indicated.

SURFACE CLOSERS

Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

DOOR GASKETING

Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

Maximum Air Leakage: When tested according to ASTM E 283 with tested pressure differential of 0.3-inch wg, as follows:

Gasketing on Single Doors: 0.3 cfm/sq. ft. of door opening.

THRESHOLDS

Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

METAL PROTECTIVE TRIM UNITS

Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch-thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.

FINISHES

Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

PART 3 - EXECUTION

INSTALLATION

Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.

Standard Steel Doors and Frames: ANSI/SDI A250.8.

Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."

Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height,

whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule, but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches of door height greater than 90 inches.

Lock Cylinders: Install construction cores to secure building and areas during construction period.

Replace construction cores with permanent cores as directed by Owner.
Furnish permanent cores to Owner for installation.

Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 07 92 00 "Joint Sealants."

Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.

Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

Do not notch perimeter gasketing to install other surface-applied hardware.

Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

ADJUSTING

Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

DOOR HARDWARE SCHEDULE

Group 1 – Exterior Entrance (Hollow Metal - Double)
(3) Stainless steel ball bearing hinges (Each Leaf)
(1) Closer (Active Leaf)
(1) Set flush bolts (Inactive Leaf)
(1) Rim latch exit device (Active Leaf)
(1) Weather stripping at jambs and head of each door
(1) Sweep (each Leaf)
(1) Threshold (continuous)
(1) Kick Plate; 8” high x 2” less than door width

Group 2 – Exterior Entrance (Hollow Metal - Single)
(3) Stainless steel ball bearing hinges
(1) Closer
(1) Rim latch exit device
(1) Weather stripping at jambs and head of door
(1) Sweep
(1) Threshold
(1) Kick Plate; 8” high x 2” less than door width

Group 3 – Exterior Entrance (Hollow Metal - Single)
(3) Stainless steel ball bearing hinges
(1) Closer

(1) Store function lever handle lockset, mortise lock
(1) Weather stripping at jambs and head of door
(1) Sweep
(1) Threshold
(1) Kick Plate; 8” high x 2” less than door width

Group 4 – Closet/Janitorial/Storage rooms (Single)
(3) Stainless steel ball bearing hinges
(1) Passage function lever handle cylindrical latch set

Group 5 – Closet (Double)
(3) Stainless steel ball bearing hinges
(1) Set flush bolts (inactive leaf)
(1) Passage function lever handle cylindrical latch set

Group 6 – Office
(3) Stainless steel ball bearing hinges
(1) Office function lever handle, cylindrical lockset

Group 7 – Pocket Door:
(1) Packaged track and guide assembly
(1) power operator with integral battery

Group 8 – Restrooms:
(3) Stainless steel ball bearing hinges
(1) Closer with hold-open
(1) push/pull handle and plate
(1) Kick Plate; 8” high x 2” less than door width

Group 9 – Storeroom Function (Mechanical)
(3) Stainless steel ball bearing hinges
(1) Closer
(1) Storeroom function lever handle, cylindrical lockset

Group 10 – Passage Latch
(3) Stainless steel ball bearing hinges
(1) Closer
(1) Passage function lever handle cylindrical latch set

END OF SECTION

Page Intentionally Left Blank

SECTION 08 80 00
GLAZING

PART 1 - GENERAL

SUMMARY
Section includes:
Glass for interior windows, interior borrowed lites, and storefront framing walls.
Glazing sealants and accessories.

COORDINATION
Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

ACTION SUBMITTALS
Product Data: For each type of product.

Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

INFORMATIONAL SUBMITTALS
Preconstruction adhesion and compatibility test report.

QUALITY ASSURANCE
Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

PRECONSTRUCTION TESTING
Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

WARRANTY
Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

Warranty Period: 10 years from date of Substantial Completion.

Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

Warranty Period: 10 years from date of Substantial Completion.

Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

MANUFACTURERS

Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include, but are not limited to the following:

Guardian Industries Corp: (800) 521-9040; www.guardian.com.
Pilkington Building Products North America: (800) 526-6557; www.pilkington.com.
PPG Industries, Inc: (412) 434-2858; www.ppg.com.
Viracon Industries: (800) 533-2080; www.viracon.com.
Substitutions: See General Conditions for substitution requirements

Tinted Annealed Float Glass: ASTM C 1036, Type I, Class 2 (tinted), Quality-Q3.

Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

INSULATING GLASS

Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.

Sealing System: Dual seals.
Spacer: Manufacturer's standard spacer material and construction.

GLAZING SEALANTS

General:

Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.

GLAZING TAPES

Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

AAMA 804.3 tape, where indicated.
AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

MISCELLANEOUS GLAZING MATERIALS

Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

PART 3 - EXECUTION

GLAZING, GENERAL

Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

Provide spacers for glass lites where length plus width is larger than 50 inches.

Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

TAPE GLAZING

Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

Apply heel bead of elastomeric sealant.

Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

Apply cap bead of elastomeric sealant over exposed edge of tape.

GASKET GLAZING (DRY)

Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

Install gaskets so they protrude past face of glazing stops.

SEALANT GLAZING (WET)

Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

Tool exposed surfaces of sealants to provide a substantial wash away from glass.

CLEANING AND PROTECTION

Immediately after installation remove nonpermanent labels and clean surfaces.

Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

Remove and replace glass that is damaged during construction period.

EXTERIOR GLAZING ASSEMBLIES

Structural Design Criteria: Select type and thickness to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with IBC code.

Use the procedure specified in ASTM E 1300 to determine glass type and thickness.
Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
Thicknesses listed are minimums.

Air and Vapor Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier:

In conjunction with vapor retarder and joint sealer materials described in other sections.
Maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

FLAT GLASS MATERIALS

Clear Float Glass: Clear, fully tempered.

Comply with ASTM C 1048.
6 mm (1/4”) minimum thickness for windows, 3/16” minimum for doors.

Tinted Glass: Float type, clear tempered, blue-gray tint color.

Viracon VNE1-37
Light transmittance of 37% percent, shading coefficient of 28%.
6 mm (1/4”) minimum thickness for windows, 3/16” minimum for doors.

SEALED INSULATING GLASS MATERIALS

Insulated Glass Units: Double pane with silicone sealant edge seal.

Outer pane of tinted glass, inner pane of clear glass.
Place low E coating on No.2 surface within the unit.
Durability: Certified by an independent testing agency to comply with ASTM E 2190.
Spacer: Manufacturer's standard desiccant filled metal bar with polyisobutylene primary seal.
Purge inter-pane space with dry hermetic air.
Total unit thickness of 1 inch.

END OF SECTION

Page Intentionally Left Blank

SECTION 09 24 00
PORTLAND CEMENT PLASTER FOR FRAMED WALLS

PART 1- GENERAL

SUMMARY

Section Includes: Work includes all labor, materials, and equipment necessary to install all aspects of a portland cement plaster assembly.

Related Sections

06 10 00 – Rough Carpentry

07 90 00 – Joint Sealers

REFERENCES

ASTM C150 – Portland cement

ASTM C847 – Standard Specification for Metal Lath

ASTM C1032 - Woven Wire Plaster Base

ASTM C933 - Welded Wire Lath

ASTM C144/C897 – Aggregate for Job-Mixed Portland Cement-Based Plaster

ASTM C926 – Application of Portland Cement-Based Plaster

ASTM C1063 – Installation of Lathing and Furring for Portland Cement Based Plaster

PCA (Portland Cement Association) – Plaster (Stucco) Manual

ICC-ES Acceptance Criteria for Weather-resistive Barriers (AC38)

SMA Details and Bulletins

ASSEMBLY DESCRIPTION

General: Portland cement plaster is comprised of a water-resistive barrier, optional sheathing, lath, scratch, brown coats, and a finish coat. Minimum nominal ¾ inch cement thickness.

Application Methods: The plaster may be applied by hand tools or machine pumps but must have sufficient force to adhere to the substrate.

Framing shall have a deflection of L/360 or stiffer

SUBMITTALS

Product Data: All product data sheets, evaluation reports, details, and warranty information that pertain to the project in accordance with Section 01 30 00 Submittal Procedures.

Samples: Submitted upon request.

Samples of the finish coat shall be of an adequate size as required to represent each color and texture to be utilized on the project and produced using the same techniques and tools required to complete the project.

No sample shall be less than 12” by 12”.

Retain approved samples at the construction site throughout the application process.

Submit a unit square foot price for a “Stucco Crack Reduction System”

QUALITY ASSURANCE

Qualifications:

Manufacturer: All component materials shall be SMA approved and shall be distributed by authorized dealers.

Plastering Contractor:

Shall specialize in lath and plaster contracting, document experience of at least 5 years, and follow SMA published recommendations or provide certificates to demonstrate stucco knowledge.

Provide proof of current contractor’s license and bond where required.

On-Site Mock-Ups: Produced upon request.

Prior to commencement of work, provide an on- site mock-up.

Mock-up shall represent construction using the same quality/techniques to be utilized on the project.

Retain approved mock-up at job site throughout the application process.

Where acceptable to the Architect, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

Contractor shall acknowledge the SMA technical Bulletins and agree to follow same

Submit letter at completion that the lath and plaster is installed per SMA recommendations.

DELIVERY, STORAGE, AND HANDLING

Delivery: Deliver all materials to the construction site in their original, unopened packaging with labels intact.

Inspection: Inspect the materials upon delivery to assure that specified products have been received. Report defects or discrepancies to the responsible party according to the construction documents; do not use reported material for application.

Storage: Store all products per manufacturer's recommendations. Generally, store materials in a cool, dry location; away from direct contact with the ground and/or concrete; out of direct sunlight; and protect from weather and other damage.

PROJECT CONDITIONS

Environmental Requirements: Follow product manufacturer's recommendations for environmental conditions and surface preparation.

Temperatures: Before, during and following the application of the portland cement plaster, the ambient and surface temperatures must remain above 40 degrees F (4 C) for a minimum period of 24 hours. Protect stucco from uneven and excessive evaporation, especially during hot, dry and/or windy weather. Protect the portland cement plaster from freezing for a period of not less than 24-hours after set has occurred.

Substrates: Prior to installation, inspect the wall for surface contamination or other defects that may adversely affect the performance of the materials, and shall be free of residual moisture. Do not apply the portland cement plaster to substrates whose temperature are less than 40 degrees F (4 C) or contain frost or ice.

All wood based products covered shall be dry and have a moisture content below 19%. DO NOT COVER WET FRAMING.

Inclement Weather: Protect applied material from deleterious effects until cured or dry.

Existing Conditions:

Contractor shall walk the project prior to starting work and notify the architect or owner's representative of any deficiencies that will negatively impact the plaster assembly. Do NOT proceed until remedied.

Contractor shall advise architect of any horizontal surfaces with inadequate slope.

Jobsite Resources: Notify architect if General Contractor fails to provide access to electrical outlets, clean, potable water, and a suitable and safe work area at the construction site throughout the application of the lath and portland cement plaster.

SEQUENCING AND SCHEDULING

Sequencing: Coordinate the installation of the lath and portland cement plaster with all other construction trades. To reduce stucco cracking, apply plaster only after the building is 90 percent dead loaded and the interior gypsum has been installed.

Plastering contractor shall request and attend a pre-installation meeting with general contractor and architect prior to the framing being completed. Plastering contractor shall advise architect of control/expansion joint layout concerns. There shall be no cost to the owner for moving one-piece control joints prior and up to this meeting date, additional lineal footage of control joints from plans shall warrant a change order.

Staffing: Provide sufficient manpower and proper supervision to ensure continuous operation, free of cold joints, scaffolding lines, curing, variations in texture, etc.

WARRANTY

Warranty: Submit documentation on all products. At completion of work, contractor shall provide a written warranty documentation for the assembly and products used.

Warranty Length: Shall start at the time of substantial completion.

MAINTENANCE

The following materials shall be presented to the owner following the application of the work:

One container of finish for each color and texture utilized on the project.

Supply a maintenance program for Owners O&M manual as required.

PART 2 – PRODUCTS

MANUFACTURERS

SMA Manufacturers: Must be from the current list on SMA website under appropriate category.

SCRATCH AND BROWN COAT (BASECOAT)

Cement: A portland cement complying with ASTM C150.

Sand:

Field mixes shall comply with ASTM C-926 and must have sand that is clean and free from deleterious amounts of loam, clay, silt, soluble salts and organic matter. Sampling and testing shall comply with ASTM C144 or C897.

An "engineered performance mix" by an SMA manufacturer is acceptable with appropriate approvals (ICC ES, IAPMO or Interek report).

Water: Clean and potable without foreign matter.

WATER-RESISTIVE BARRIER

A. Over non-Wood-based Sheathing:

One layer of asphalt-saturated felt complying with ASTM D226 Type I

Equivalent material recognized in a current evaluation report as complying with the ICC-ES Acceptance Criteria for Water-Resistive Barriers (AC38).

B. Over Wood-based Sheathing:

Two layers of asphalt-saturated felt complying with ASTM D226 Type I

Double layer of equivalent material recognized in a current evaluation report as complying with the ICC-ES Acceptance Criteria for Water-resistive Barriers (AC38).

SMA approved fluid applied WRB and one layer D paper, felt or equivalent

LATH

Woven-Wire Lath: Nominal No. 17 gauge (0.058 inch), 1.5-inch opening, galvanized steel complying with ASTM C1032.

SHEATHING

Glass Matt Sheathing: Glass mat faced, water-resistant treated core gypsum sheathing must comply with ASTM C1177 and be recognized in a current evaluation report.

ACCESSORIES

Sealants: Acrylic latex complying with ASTM C834.

Flashing (by others): Flashing complying with IBC Section 1405.4 (2013) or IRC Section R703.8, as applicable, WRB must integrate in a "Shingle Fashion" with flashings.

Fasteners: Nails, staples, or screws used to rigidly secure lath and associated accessories shall be corrosion-resistant and meet the minimum requirements of ASTM C1063.

Zinc and Zinc-Coated (Galvanized) Accessories: The following accessories shall be fabricated from zinc or zinc-coated (galvanized) steel .

Corner Aid: Minimum 26-gauge thick; expanded flanges shaped to permit complete embedding in plaster; minimum 2 in. wide; Square-edge style; use unless otherwise indicated.

Strip Mesh: Metal Lath, 3.4 lb/yd^2 expanded metal; 6 in. wide x 18 in. long.

Vent Screed: Minimum 26-gauge thick; thickness governed by plaster thickness; minimum 4-inch (102 mm) width, double "V" profile, with perforated expanse between "V's" of longest possible lengths.

Casing Bead: Minimum 26-gauge thick; thickness governed by plaster thickness; maximum possible lengths; expanded metal flanges, with square edges.

Drip Screed: Minimum 26-gauge thick, depth governed by plaster thickness, minimum 3-1/2 in. high flange, and maximum possible lengths.

Control and Expansion Joints: Depth to conform to plaster thickness; use maximum practical lengths.

Control Joints: One-piece-type, folded pair of unperforated screeds in insert shape: M-shaped, double V, etc. configuration; removable protective tape on plaster face of control joint.

Expansion Joints: Pair of casing beads with sealant between.

PRIMER

For acrylic finish coats primer by finish coat manufacturer selected

FINISHES

Portland cement-based blended stucco finish: see SMA list

Color and Texture: Color and finish texture shall be as selected by the Architect.

MIXES

Portland cement Plaster Basecoats:

Prescriptive Method: Ratios and Mix Design shall be per ASTM C926. Contractor shall select one of the following mixes (sand is per combined volume of cements):

Portland Cement 1 part

Masonry Cement	1 part
Sand	3 ½ to 4 ½ parts per Cement
Fibers	Maximum 3 oz. per batch

Portland Cement 1 part

Lime (type S)	¼ to ½ part
Sand	3 to 4 parts per cement & Lime
Fibers	Maximum 3 oz. per batch

Plastic Cement 1 part

Sand	3 ½ to 4 ½ parts per cement
Fibers	Maximum 3 oz. per bag plastic cement

Engineered Method: Pre-mix blends or silos per SMA manufacturer.

Finish Coats: Mixing and tinting instructions are contained in the appropriate product data sheets by the SMA Manufacturer.

PART 3 – EXECUTION

EXAMINATION

Prior to the application of the Portland cement plaster basecoat the plastering contractor shall ensure that:

Surface and site conditions are ready to receive work.

Grounds and Blocking: Verify that the items within the walls for other sections of work have been installed.

Notify architect/owner of any defects that may impact the finished assembly. Proceed as directed.

Substrates:

Acceptable substrates must be sound, secure and suitable for lath and plaster.

Substrates and adjacent materials must be dry and clean. Substrate surface must be flat, free of protrusions or planar irregularities greater than ¼-nch in 10-feet (6mm in 3m).

Flashings: All flashing around windows, at deck attachments, utility penetrations, roof lines, etc. and all kick-out flashing must be properly installed prior to application of Portland cement plaster. Notify owner if flashings are missing, proceed as directed.

Unsatisfactory conditions or concerns shall be reported to the general contractor and/or builder and/or architect and/or owner. Do not proceed until directed in writing by architect or general contractor.

PREPARATION

Substrate/Framing: inspect all work prior to starting lath and plastering. Notify architect of any issues impacting performance, proceed as directed.

Surrounding Areas: Protect surfaces near the work of this section from damage, disfiguration, and overspray. Mask off all dissimilar materials.

INSTALLATION, GENERAL

General Installation: Refer to, ASTM C926, ASTM C1063, and/or the appropriate manufacturer's product data sheet for additional installation requirements and recommendations of the SMA.

INSTALLING WEATHER PROTECTION

Water-Resistive Barrier: Apply water-resistive barrier complying with Section 1404.2 of the IBC or Section R703.2 of the IRC. Start at base of wall and overlap flashing flanges and in a "shingle-fashion" by a minimum of two (2) inches horizontal and six (6) inches vertical. Integrate with flashings to insure incidental moisture drains down and weeps out. Reverse laps shall not be allowed.

Window Flashing (by others): Contractor shall inspect and verify the flashing between the window/door and the cement plaster is appropriate for the condition. Notify architect of any concerns. Refer to SMA flashing guidelines for nail flange style windows.

Flashing: Install flashing and trim per current Building Code. *Install flashing and trims properly to insure moisture does not accumulate and can easily drain to the exterior. All openings shall be properly flashed and designed to allow water to escape to the outside of the wall. All penetrations shall be properly flashed and/or sealed using approved methods. Walls should be designed to prevent bulk water from getting behind the stucco or running down the face of the stucco. The bottom of the wall is required to have weep screed or another effective means to drain any water that may get behind the stucco.*

INSTALLING LATH/TRIMS

General: Installed per ASTM C1063 or per Architect's direction. Trims shall be full length and installed plumb/level to within 1/8 inch in eight (8) feet.

Weep screed shall be installed at the base of all framed walls.

Trims shall be attached per the trim manufacturers instructions; however do not exceed 24 inches on center spacing.

Apply lath per manufacturers recommendations. Laps shall occur at horizontal and vertical joints. Attach lath six (6) to seven (7) inches on center along framing supports (studs). Fastener shall penetrate wood by a minimum ¾ inch, penetration of wood based sheathing shall count as 50% of dimensional lumber. Metal framing by a minimum of three (3) full threads and engage the lath.

Lath shall lap the flange of accessories by more than 50%.

Control Joints: Installed per Architects direction. Single-piece control joint may be installed over continuous lath if approved by Building Official and/or Architect. If lath is discontinuous, framing shall support lath terminations. Notify architect of issues or changes.

Expansion Joints: Install per Architect's direction. Two piece joints (expansion) must have lath terminate each side.

Contractor shall honor control or expansion joints in substrates.

Do not mix lath products on same wall.

Avoid excessive laps with expanded metal lath

Do not use rib lath on walls

Use wire nose corner for cement finish, PVC nose for acrylic finish

Lath shall cover more than 75% of solid flanges.

INSTALLING PORTLAND CEMENT PLASTER

Per ASTM C926, apply portland cement plaster by hand-troweling or machine-spraying to a nominal thickness of 3/8-inch (9.5mm) for scratch coat. Then apply a second coat to a nominal thickness of 3/8-inch (9.5 mm) brown coat. Total basecoat shall be a nominal ¾ inch thickness.

Scratch coat shall substantially cover the lath and be applied with sufficient pressure to encase the lath in cement. Slickers to apply cement plaster are prohibited. Score in a horizontal pattern.

Allow to cure 48 hours, or until sufficiently rigid to accept a brown coat.

Apply brown coat to fill and complete basecoat. Nominal ¾ inch thickness. Rod to a flat plane. Do not apply to frozen or soft scratch coat. When excess moisture leaves brown coat, hard float to provide densification per ATSM. Hard floating procedure may be omitted if the "Base coat and Mesh or Stucco crack reduction system" is selected.

Moist Curing: Provide sufficient moisture by fog or moist curing to permit proper hydration of the cementitious materials. The length of time and most effective procedure for curing will depend on climatic and job conditions. Refer to SMA curing guidelines.

INSTALLING FINISH COAT

General: Mix and apply per manufacturer's product data sheet.

Do not apply to soft, contaminated or frozen basecoat.

Avoid applying to excessively hot walls.

Verification: Verify the desired color, material and texture to match the approved sample and/or mock-up prior to installation.

Avoid scaffold lines and cold joints

Fog coat (cement finish only) as needed to blend color variations

Finish coat shall be free of eye catching imperfections.

CLEANING/PATCHING/TOLERANCE

Cleaning: Remove any and all materials used, overspray from adjacent surfaces, and all protective masking.

Patch and repair as needed, including but not limited to fog coating, imperfections and blisters.

Cracks shall be repaired per the most current SMA Crack Policy (Technical Bulletin 4)

The basecoat of plaster shall be in tolerance:

- Residential: Not to exceed ¼ inch in eight (8) feet
- Commercial: Not to exceed ¼ inch in ten (10) feet

Eye catching variations in color or texture pattern will not be accepted.

PROTECTION

Protection: Protect applied material from inclement weather until dry and prevent it from freezing for a minimum of 24-hours after set and/or until dry. Refer to manufacturer's product data sheet for additional requirements.

END OF SECTION

SECTION 09 29 00
GYPSUM BOARD

PART 1 - GENERAL

SUMMARY
Section Includes:
Interior gypsum board.

ACTION SUBMITTALS
Product Data: For each type of product.

Samples: For each texture finish indicated on same backing indicated for Work.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

GYPSUM BOARD, GENERAL
Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

INTERIOR GYPSUM BOARD
Gypsum Wallboard: ASTM C 1396/C 1396M.

Thickness: 5/8 inch.
Long Edges: Tapered.

Gypsum Board, Type X: ASTM C 1396/C 1396M. For all areas with moisture (example: Restrooms & Kitchen)

Thickness: 5/8 inch.
Long Edges: Tapered.

TRIM ACCESSORIES
Interior Trim: ASTM C 1047.

Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
Shapes:

Cornerbead.
Bullnose bead.
LC-Bead: J-shaped; exposed long flange receives joint compound.
L-Bead: L-shaped; exposed long flange receives joint compound.
U-Bead: J-shaped; exposed short flange does not receive joint compound.
Expansion (control) joint.
Curved-Edge Cornerbead: With notched or flexible flanges.

JOINT TREATMENT MATERIALS
General: Comply with ASTM C 475/C 475M.

Joint Tape:

Interior Gypsum Board: Paper.

Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.

Use setting-type compound for installing paper-faced metal trim accessories.

Fill Coat: For second coat, use drying-type, all-purpose compound.
Finish Coat: For third coat, use drying-type, all-purpose compound.

AUXILIARY MATERIALS

General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

Steel Drill Screws: ASTM C 1002 unless otherwise indicated.

Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

Thermal Insulation: As specified in Section 07 21 00 "Thermal Insulation."

Vapor Retarder: As specified in Section 07 26 00 "Vapor Retarders."

PART 3 - EXECUTION

APPLYING AND FINISHING PANELS

Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

Comply with ASTM C 840.

Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

Prefill open joints, rounded or beveled edges, and damaged surface areas.

Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

Level 1: Ceiling plenum areas, concealed areas, and where indicated.
Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.

Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."

PROTECTION

Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION

Page Intentionally Left Blank

SECTION 09 30 13
CERAMIC TILING

PART 1 - GENERAL

SUMMARY
Section Includes:
- Ceramic mosaic tile.
- Porcelain tile.
- Glazed wall tile.
- Tile backing panels.
- Waterproof membrane for thinset applications.
- Crack isolation membrane.
- Metal edge strips.

ACTION SUBMITTALS
Product Data: For each type of product.

Samples:
- Each type and composition of tile and for each color and finish required. For ceramic mosaic tile in color blend patterns, provide samples of each color blend.
- Stone thresholds.

INFORMATIONAL SUBMITTALS
Qualification Data: For Installer.

MAINTENANCE MATERIAL SUBMITTALS
Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

- Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

QUALITY ASSURANCE
Installer Qualifications:

- Installer is a five-star member of the National Tile Contractors Association.
- Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
- Installer employs Ceramic Tile Education Foundation Certified Installers.

PART 2 - PRODUCTS

PRODUCTS, GENERAL
ANSI Ceramic Tile Standard: Provide Standard-grade tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

TILE PRODUCTS
Ceramic Tile Type; color body porcelain tile.

- Composition: Porcelain,
- Certification: Porcelain tile certified by the Porcelain Tile Certification Agency.

Module Size: 12x24 inch.
Thickness: 1/4 inch.
Dynamic Coefficient of Friction: Not less than 0.42.
Finish: Mat, opaque glaze.
Tile Color and Pattern: As selected by Architect from manufacturer's full range
Grout Color: As selected by Architect from manufacturer's full range
Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

Base Cove: Cove, module size 6”x12”
Base Cap: Bead (bullnose)
Wainscot Cap: Bead (bullnose)
External Corners for Thinset Mortar Installations: Bead (bullnose), module size
Internal Corners: Cove, module size
Tapered Transition Tile: Shape designed to effect transition between adjoining finishes of different thickness, tapered to provide reduction in thickness from 1/2 to 1/4 inch across nominal 4-inch dimension.

Accent Tile; penny-round iridescent glass, smooth, semi-irregular surface, color to be selected (Susan Jablon or equivalent), provided with backer allowing installation as a mosaic, approximately 12”x12” square panels.

THRESHOLDS

General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch or less above adjacent floor surface.

Marble Thresholds: ASTM C 503/C 503M, with a minimum abrasion resistance of 10 according to ASTM C 1353 or ASTM C 241/C 241M and with honed finish.

Description: Uniform, fine- to medium-grained white stone with gray veining.

TILE BACKING PANELS

Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, Type A.

Thickness: 1/4 inch

Fiber-Cement Backer Board: ASTM C 1288.

Thickness: 1/4 inch

WATERPROOF MEMBRANE

General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

Chlorinated Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric.

Nominal Thickness: 0.030 inch.

CRACK ISOLATION MEMBRANE
General: Manufacturer's standard product that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

Chlorinated Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric; 0.030-inch nominal thickness.

SETTING MATERIALS
Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.

Standard Dry-Set Mortar (Thinset): ANSI A118.1.

For wall applications, provide nonsagging mortar.

GROUT MATERIALS
Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.

High-Performance Tile Grout: ANSI A118.7.
Polymer Type: Liquid-latex form for addition to prepackaged dry-grout mix.

MISCELLANEOUS MATERIALS
Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.

Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

PART 3 - EXECUTION

EXAMINATION
Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
Verify that concrete substrates for tile floors installed with bonded mortar bed or thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

Proceed with installation only after unsatisfactory conditions have been corrected.

PREPARATION
Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.

Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

CERAMIC TILE INSTALLATION

Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:

Tile floors in wet areas.
Tile floors consisting of tiles 8 by 8 inches or larger.
Tile floors consisting of rib-backed tiles.

Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

Where accent tile differs in thickness from field tile, vary setting bed thickness so that tiles are flush.

Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

Ceramic Mosaic Tile: 1/8 inch
Quarry Tile: 1/4 inch.
Glazed Wall Tile: 1/8 inch.
Porcelain Tile: 1/4 inch.

Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.

At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in improved modified dry-set mortar (thinset).

Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile

Floor Sealer: Apply floor sealer to cementitious grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

Install tile backing panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated.

Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

END OF SECTION

Page Intentionally Left Blank

SECTION 09 51 13
ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

SUMMARY
Section includes acoustical panels and exposed suspension systems for interior ceilings.

PREINSTALLATION MEETINGS
Preinstallation Conference: Conduct conference at Project site.

ACTION SUBMITTALS
Product Data: For each type of product.

Samples: For each exposed product and for each color and texture specified.

Delegated-Design Submittal: For seismic restraints for ceiling systems.

Include design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

INFORMATIONAL SUBMITTALS
Coordination Drawings: Reflected ceiling plans, drawn to scale, and coordinated with each other, using input from installers of the items involved.

Product test reports.

Research reports.

Field quality-control reports.

CLOSEOUT SUBMITTALS
Maintenance data.

PART 2 - PRODUCTS

ACOUSTICAL PANELS (ACT-1)
Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Armstrong World Industries, Inc.
Chicago Metallic Corporation.
USG Corporation.

Acoustical Panel Standard: Manufacturer's standard panels according to ASTM E 1264.

Classification: FS SS-S-118.

Color: White.

Light Reflectance (LR): Class A, 0.75 or greater.

Ceiling Attenuation Class (CAC): 35-39.

Noise Reduction Coefficient (NRC): 0.55.

Edge/Joint Detail: Reveal sized to fit flange of exposed suspension-system members

Thickness: 5/8 inch.

Modular Size: 24 by 24 inches.

Vinyl on Gypsum Board Panels (VACT-1): Provide Vinylrock-X non-perforated 24 inch x 24 inch x 1/2 inch vinyl faced Type-X gypsum board ceiling panels as manufactured by Capaul Ceilings or equal. Provide all panels with a factory applied, washable white vinyl finish having a light reflectivity Class A, 0.75 or greater, according to ASTM C523. Ceiling sound transmission class shall fall within the range 40-44, according to AIMA 1-11. Ceiling panels shall have a flame spread rating of 0-25, according to ASTM E84. Provide edge sealer as recommended by ceiling manufacturer for all panels requiring trimming to fit within the ceiling grids. Sealer shall be applied as recommended by ceiling manufacturer. Panels shall weigh a minimum of 1 lb. per sq. ft.

METAL SUSPENSION SYSTEM

Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Armstrong World Industries, Inc.
Chicago Metallic Corporation.

Metal Suspension-System Standard: Manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M.

Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.

Structural Classification: Intermediate-duty system.
End Condition of Cross Runners: Override (stepped) or butt-edge type.
Face Design: Flat, flush.
Cap Material: Cold-rolled steel or aluminum.
Cap Finish: Painted white.

ACCESSORIES

Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

Hold-Down Clips: Manufacturer's standard hold-down.

Impact Clips: Manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.

METAL EDGE MOLDINGS AND TRIM

Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

PART 3 - EXECUTION

PREPARATION

Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated.

Layout openings for penetrations centered on the penetrating items.

INSTALLATION

Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.

Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

Do not use exposed fasteners, including pop rivets, on moldings and trim.

Arrange directionally patterned acoustical panels as follows:

As indicated on reflected ceiling plans.

Install panels with pattern running in one direction parallel to long axis of space.

Install panels in a basket-weave pattern.

Install hold-down clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.

FIELD QUALITY CONTROL

Special Inspections: Engage a qualified special inspector to perform inspections.

Periodic inspection during the installation of suspended ceiling grids according to ASCE/SEI 7.

END OF SECTION

Page Intentionally Left Blank

SECTION 09 65 13
RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

SUMMARY
Section Includes:
Vinyl base.

ACTION SUBMITTALS
Product Data: For each type of product.

Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

VINYL BASE
Product Standard: ASTM F 1861, Type TV (vinyl, thermoplastic).

Group: I (solid, homogeneous) or II (layered).
Style and Location:

Style A, Straight: Provide in areas with carpet.
Style B, Cove: Provide in areas with resilient floor coverings.

Minimum Thickness: 0.125 inch.

Height: 4 inches.

Lengths: Cut lengths 48 inches long or coils in manufacturer's standard length.

Outside Corners: Preformed.

Inside Corners: Preformed.

Colors and Patterns: As selected by Architect from manufacturer's full range.

INSTALLATION MATERIALS
Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

Floor Polish: Provide protective, liquid floor-polish products recommended by resilient stair-tread manufacturer.

PART 3 - EXECUTION

PREPARATION
Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

Do not install resilient products until materials are the same temperature as space where they are to be installed.

Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

RESILIENT BASE INSTALLATION

Comply with manufacturer's written instructions for installing resilient base.

Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

Do not stretch resilient base during installation.

On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

Preformed Corners: Install preformed corners before installing straight pieces.

Job-Formed Corners:

Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.

Form without producing discoloration (whitening) at bends.

Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.

Miter or cope corners to minimize open joints.

RESILIENT ACCESSORY INSTALLATION

Comply with manufacturer's written instructions for installing resilient accessories.

Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

CLEANING AND PROTECTION

Comply with manufacturer's written instructions for cleaning and protecting resilient products.

Floor Polish: Remove soil, adhesive, and blemishes from resilient stair treads before applying liquid floor polish.

Apply two coat(s).

Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION

SECTION 09 91 13
EXTERIOR PAINTING

PART 1 - GENERAL

SUMMARY
Section includes surface preparation and the application of paint systems on exterior substrates.
Concrete.
Steel and iron.

DEFINITIONS
MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

ACTION SUBMITTALS
Product Data: For each type of product. Include preparation requirements and application instructions.

Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

Samples: For each type of paint system and each color and gloss of topcoat.

PART 2 - PRODUCTS

MANUFACTURERS
Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Benjamin Moore Paints
Diamond-Vogel Paints
ICI Paints
Mautz Paints
PPG (Industries, Inc. (Pittsburgh Paints)
Sherwin-Williams Paints

Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Exterior Painting Schedule for the paint category indicated.

PAINT, GENERAL
MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

Material Compatibility:

Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

EXAMINATION

Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

Concrete: 12 percent.
Fiber-Cement Board: 12 percent.
Masonry (Clay and CMU): 12 percent.
Wood: 15 percent.
Portland Cement Plaster: 12 percent.
Gypsum Board: 12 percent

Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

Proceed with coating application only after unsatisfactory conditions have been corrected.

Application of coating indicates acceptance of surfaces and conditions.

PREPARATION

Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

APPLICATION

Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."

Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

CLEANING AND PROTECTION

Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

EXTERIOR PAINTING SCHEDULE

Provide the following finish coating systems for substrates as shown and/or scheduled and as herein specified. Paints by Sherwin Williams (S-W) are specified to establish a standard of type and quality.

A. Ferrous Metal, Galvanized-Metal, and Aluminum Substrates:
   1. Water-Based Light Industrial Coating System:
      a. Prime Coat: Primer, water based.
         1) S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, 5.0 to 10.0 mils (0.127 to 0.254 mm) wet, 2.0 to 4.0 mils (0.051 to 0.102 mm) dry.
      b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
      c. Topcoat: Light industrial coating, exterior, water based eggshell.
         1) S-W Pro Industrial Eg-Shel Acrylic B66-660 Series, at 2.5 to 4.0 mils (0.064 to 0.102 mm) dry, per coat.

B. Wood Substrates: Including exposed wood items not indicated to receive shop-applied finish.
   1. Latex System:
      a. Prime Coat: Primer, latex for exterior wood.
         1) S-W Exterior Latex Primer, B42, at 4.0 mils (0.102 mm) wet, 1.4 mils (0.036 mm) dry, per coat.
      b. Intermediate Coat: Latex, exterior, matching topcoat.
      c. Topcoat: Latex, exterior, satin:
         1) S-W A-100 Exterior Latex Satin, A82 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

C. Plastic Trim Fabrication Substrates: Including architectural PVC, plastic, and fiberglass items.
   1. Latex System:
      a. Prime Coat: Primer, bonding, water-based:
         1) S-W PrepRite ProBlock Latex Primer/Sealer, B57-620 Series, at 4.0 mils (0.102 mm) wet, 1.4 mils (0.036 mm) dry.
      b. Intermediate Coat: Latex, exterior, matching topcoat.
      c. Topcoat: Latex, exterior, satin:
         1) S-W A-100 Exterior Latex Satin, A82 Series, at 4.0 mils (0.102 mm) wet, 1.5 mils (0.038 mm) dry, per coat.

END OF SECTION

Page Intentionally Left Blank

SECTION 09 91 23
INTERIOR PAINTING

PART 1 - GENERAL

SUMMARY

Section includes surface preparation and the application of paint systems on the following interior substrates:

Concrete.
Galvanized metal.
Aluminum (not anodized or otherwise coated).
Wood.
Gypsum board.

DEFINITIONS

MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

ACTION SUBMITTALS

Product Data: For each type of product. Include preparation requirements and application instructions.

Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

Samples: For each type of paint system and in each color and gloss of topcoat.

PART 2 - PRODUCTS

MANUFACTURERS

Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Benjamin Moore Paints
Diamond-Vogel Paints
ICI Paints
Mautz Paints
PPG (Industries, Inc. (Pittsburgh Paints)
Sherwin-Williams Paints

Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Interior Painting Schedule for the paint category indicated.

PAINT, GENERAL

MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

Material Compatibility:

Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

EXAMINATION

Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

Gypsum Board: 12 percent.

Plaster: 12 percent.

Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

Proceed with coating application only after unsatisfactory conditions have been corrected.

Application of coating indicates acceptance of surfaces and conditions.

PREPARATION

Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

APPLICATION

Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

INTERIOR PAINTING SCHEDULE

Provide the following finish coating systems for substrates as shown and/or scheduled and as herein specified. Paints by Sherwin Williams (S-W) are specified to establish a standard of type and quality.

A. Metal Substrates (Aluminum, Steel, Galvanized Steel):
   1. Latex System:
      a. Prime Coat: Primer, rust-inhibitive, water based:
         1) S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils (0.127 to 0.254 mm) wet, 2.0 to 4.0 mils (0.051 to 0.102 mm) dry.
      b. Intermediate Coat: Water-based acrylic, interior, matching topcoat.
      c. Topcoat: Water-based acrylic, semi-gloss:
         1) S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, at 2.5 to 4.0 mils (0.064 to 0.102 mm) dry, per coat.

B. Wood Substrates: Including exposed wood items not indicated to receive shop-applied finish.
   1. Latex System:
      a. Prime Coat: Primer sealer, latex, interior:
         1) S-W PrepRite ProBlock Primer Sealer, B51-620 Series, at 4.0 mils (0.102 mm) wet, 1.4 mils (0.036 mm) dry.
      b. Intermediate Coat: Latex, interior, matching topcoat.
      c. Topcoat: Latex, interior, eggshell:
         1) S-W ProMar 200 Zero VOC Latex Eg-Shel, B20-2600 Series, at 4.0 mils (0.102 mm) wet, 1.7 mils (0.043 mm) dry, per coat.

C. Gypsum Board Substrates:
   1. Latex System:
      a. Prime Coat: Primer, latex, interior:
         1) S-W ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 mils (0.102 mm) wet, 1.0 mils (0.025 mm) dry.
      b. Intermediate Coat: Latex, interior, matching topcoat.
      c. Topcoat: Latex, interior, eggshell:
         1) S-W ProMar 200 Zero VOC Latex Eg-Shel, B20-2600 Series, at 4.0 mils (0.102 mm) wet, 1.7 mils (0.043 mm) dry, per coat.

END OF SECTION

Page Intentionally Left Blank

SECTION 10 21 13.16
PLASTIC-LAMINATE-CLAD TOILET COMPARTMENTS

PART 1 - GENERAL

SUMMARY
Section Includes:
Plastic-laminate-clad toilet compartments configured as toilet enclosures.

ACTION SUBMITTALS
Product Data: For each type of product.

Shop Drawings: For toilet compartments. Include plans, elevations, sections, details, and attachment details.

Samples for each type of toilet compartment material indicated.

INFORMATIONAL SUBMITTALS
Product certificates.

CLOSEOUT SUBMITTALS
Maintenance data.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

Flame-Spread Index: 25 or less.
Smoke-Developed Index: 450 or less.

Regulatory Requirements: Comply with applicable provisions in ICC A117.1 for toilet compartments designated as accessible.

PLASTIC-LAMINATE-CLAD TOILET COMPARTMENTS
Toilet-Enclosure Style: Overhead braced.

Door, Panel, and Pilaster Construction: One-piece, plastic-laminate facing sheets pressure laminated to core material without splices or joints in facings or cores; with laminate applied to edges before faces to seal edges and prevent laminate from being pried loose. Seal exposed core material at cutouts to protect core from moisture.
Core Material: Particleboard.
Doors and Panels: Finished to not less than 7/8 inch thick.
Pilasters: Provide construction to comply with one of the following:

Finished to not less than 1-1/4 inches thick and with internal, nominal 0.134-inch-thick, steel-sheet reinforcement.
Finished to 1-1/4 inches thick and with manufacturer's standard steel-sheet core laminated to both sides of honeycomb of resin-impregnated kraft paper in lieu of particleboard core.
Finished to not less than 1 inch thick and with internal, nominal 0.120-inch-thick, steel-sheet reinforcement.

Pilaster Shoes and Sleeves (Caps): Formed from stainless steel sheet, not less than 0.031-inch nominal thickness and 3 inches high, finished to match hardware.

Brackets (Fittings):

Stirrup Type: Ear or U-brackets, stainless steel.
Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

Plastic-Laminate Finish: One color and pattern in each room.

Color and Pattern: As selected by Architect from manufacturer's full range.

HARDWARE AND ACCESSORIES

Hardware and Accessories: Manufacturer's standard operating hardware and accessories.

Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.

Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.

Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel anchors compatible with related materials.

MATERIALS

Particleboard: ANSI A208.1, Grade M-2.
Plastic Laminate: NEMA LD 3, general-purpose HGS grade, 0.048-inch nominal thickness.

FABRICATION

Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.

Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.

Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

Door Size and Swings: Unless otherwise indicated, provide 24-inch-wide in-swinging doors for standard toilet compartments and 36-inch-wide out-swinging doors with a minimum 32-inch-wide clear opening for compartments designated as accessible.

PART 3 - EXECUTION

INSTALLATION

General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

Maximum Clearances:
Pilasters and Panels: 1/2 inch.
Panels and Walls: 1 inch.
Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than two brackets attached near top and bottom of panel.

Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
Align brackets at pilasters with brackets at walls.

Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.
Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
Align brackets at pilasters with brackets at walls.

ADJUSTING

Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION

Page Intentionally Left Blank

SECTION 10 28 00
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

SUMMARY
Section Includes:
Public-use washroom accessories.
Underlavatory guards.

ACTION SUBMITTALS
Product Data: For each type of product.

Samples: Full size, for each exposed product and for each finish specified.

INFORMATIONAL SUBMITTALS
Sample warranty.

CLOSEOUT SUBMITTALS
Maintenance data.

WARRANTY
Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PUBLIC-USE WASHROOM ACCESSORIES
Toilet Tissue (Roll) Dispenser:

Description: Single-roll dispenser.
Mounting: Surface mounted.
Operation: Noncontrol delivery with standard spindle.
Capacity: Designed for 4-1/2- or 5-inch- diameter tissue rolls.
Material and Finish: Stainless steel, No. 4 finish (satin).

Paper Towel (Folded) Dispenser:

Mounting: Surface mounted.
Minimum Capacity: 400 single-fold towels.
Material and Finish: Stainless steel, No. 4 finish (satin).
Lockset: Tumbler type.
Refill Indicator: Pierced slots at sides or front.

Liquid-Soap Dispenser:

Description: Designed for dispensing antibacterial soap in liquid or lotion form.
Mounting: Vertically oriented, surface mounted.
Capacity: 46 oz.

Lockset: Tumbler type.
Refill Indicator: Window type.

Grab Bar:

Mounting: Flanges with concealed fasteners.
Material: Stainless steel, 0.05 inch thick.
Finish: Smooth, No. 4 finish (satin).
Outside Diameter: 1-1/2 inches.
Configuration and Length: As indicated on Drawings.

Mirror Unit:

Frame: Stainless-steel channel.

Corners: Manufacturer's standard.

CUSTODIAL ACCESSORIES

Mop and Broom Holder:

Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
Hooks: Four.
Mop/Broom Holders: Three, spring-loaded, rubber hat, cam type.
Material and Finish: Stainless steel, No. 4 finish (satin).

UNDERLAVATORY GUARDS

Underlavatory Guard:

Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.
Material and Finish: Antimicrobial, molded plastic, white.

PART 3 - EXECUTION

INSTALLATION

Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

END OF SECTION

SECTION 10 30 00
FIREPLACES AND STOVES

PART 1 GENERAL

Summary
Provide gas fireplace as shown and as specified. Applicable provisions of Division 01 shall govern all work under this section.

Submittals
Submit shop drawings in accordance with section 01 30 00.

Field Measurements
Where practicable, obtain field measurements prior to preparation of shop drawings and fabrication to ensure proper fit. Allow for trimming and fitting wherever exact field measurements cannot be obtained before fabrication.

Acceptable Manufacturers
Fireplace by one of the following manufacturers shall be acceptable providing the specified requirements are met or exceeded.

Acucraft
Bentintoshape
Heat -N- Glow
Superior

PART 2 PRODUCTS

Fireplace
Provide Acucraft Blaze 8 (BL-8-SS) fireplace. ANSI Z21.50-2016 design certified.

Outdoor Fire Pit
Bentintoshape | FP-CT-38RD-GM-P 38" Round Cor-Ten Steel Fire Pit, with permanent piping and seasonal disconnect.

PART 3 EXECUTION

Installation
Install fireplace in location in accordance with shop drawings and manufacturer recommendations and instructions. Provide grounds, clips, backing materials, brackets and anchors, trim, fasteners and accessories for complete installation.

Install units plumb and level.

*****

Page Intentionally Left Blank

SECTION 10 44 13
FIRE PROTECTION CABINETS

PART 1 - GENERAL

SUMMARY
Section includes fire-protection cabinets for portable fire extinguishers.

ACTION SUBMITTALS
Product Data: For each type of product.
Shop Drawings: For fire-protection cabinets.

CLOSEOUT SUBMITTALS
Maintenance data.

COORDINATION
Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

Coordinate sizes and locations of fire-protection cabinets with wall depths.

SEQUENCING
Apply vinyl lettering on field-painted fire-protection cabinets after painting is complete.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

FIRE-PROTECTION CABINET
Cabinet Type: Suitable for fire extinguisher.

Cabinet Construction: Nonrated.

Cabinet Material: Cold-rolled steel sheet.

Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

Rolled-Edge Trim: 2-1/2-inch backbend depth.

Cabinet Trim Material: Steel sheet.

Door Material: Steel sheet.

Door Style: Fully glazed panel with frame.

Door Glazing: Clear float glass.

Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

Accessories:

Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect.

Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."

Location: Applied to cabinet door.
Application Process: Decals.
Lettering Color: Red.

Materials:

Cold-Rolled Steel: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

Finish: Baked enamel or powder coat.
Color: As selected by Architect from full range of industry colors and color densities.

Clear Float Glass: ASTM C 1036, Type I, Class 1, Quality q3, 3 mm thick.

FABRICATION

Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

PART 3 - EXECUTION

INSTALLATION

Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

Identification: Apply decals at locations indicated.

Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

END OF SECTION

SECTION 10 44 16
FIRE EXTINGUISHERS

PART 1 - GENERAL

SUMMARY
Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

ACTION SUBMITTALS
Product Data: For each type of product.

INFORMATIONAL SUBMITTALS
Warranty: Sample of special warranty.

CLOSEOUT SUBMITTALS
Operation and maintenance data.

COORDINATION
Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

WARRANTY
Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS
Fire Extinguishers: Type, size, and capacity for each mounting bracket indicated.

Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
JL Industries, Inc.; a division of the Activar Construction Products Group.
Larsens Manufacturing Company.

Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.

Regular Dry-Chemical Type: UL-rated 10 lbs. nominal capacity, with sodium bicarbonate-based dry chemical in manufacturer's standard enameled container.

MOUNTING BRACKETS
See drawings for fire extinguisher locations. Some extinguishers will be mounted with brackets other will be in cabinets see section 10 44 13 “Fire Protection Cabinets”.

Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.

Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

Orientation: Vertical.

PART 3 - EXECUTION

INSTALLATION

Examine fire extinguishers for proper charging and tagging.

Remove and replace damaged, defective, or undercharged fire extinguishers.

Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

Mounting Brackets: 54 inches above finished floor to top of fire extinguisher.

Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION

SECTION 10 82 13
ROOF SCREENS

PART 1 - GENERAL

SECTION INCLUDES

Stand-alone roof equipment screens and supporting steel framework. Screens shall be designed to attach to the roof structure and not the equipment being screened.

Roof screen accessories.

RELATED SECTIONS

Section 05 50 00 - Metal Fabrications: Frames and supports.

Section 07 72 13 - Roof Curbs.

Section 09 90 00 - Paints and Coatings: Field applied paint finish.

REFERENCES

ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

ASTM A 1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

ASTM D 4811 - Standard Specification for Nonvulcanized (Uncured) Rubber Sheet Used as Roof Flashing.

ASTM D 6878 - Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing.

ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.

AWS D1.1 - Structural Welding Code - Steel.

AWS D1.6 - Structural Welding Code - Stainless Steel.

COORDINATION

Coordinate Work with other operations and installation of roofing materials to avoid damage to installed insulation and membrane materials.

ACTION SUBMITTALS

Submit under provisions of Section 01 33 00.

Product Data: Manufacturer's data sheets on each product to be used, including:
- Preparation instructions and recommendations.
- Storage and handling requirements and recommendations.
- Installation methods.

Shop Drawings: Layout and erection drawings showing typical cross sections and dimensioned locations of all frames and base supports. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, shape, and patterns.

INFORMATIONAL SUBMITTALS

Design Calculations: 3 copies of structural design calculations for structural components and components resisting wind loads with seal and signature of professional engineer licensed in the State of Wisconsin.

Manufacturer's Certificates: Certify products meet or exceed specified requirements.

Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

Warranties: 3 signed copies.

QUALITY ASSURANCE

Manufacturer Qualifications: Manufacturer with a minimum five years documented experience in producing pre-manufactured metal-framed equipment screens.

Design Qualifications: Provide structural design calculations stamped by a professional engineer licensed in the state in which this project is located.

Welders: AWS certified within previous 12 months.

Pre-Installation Meeting:
- Convene at job site, at least seven calendar days prior to scheduled beginning of construction activities of this section, to review requirements of this section.
- Require attendance by representatives of the installing subcontractor (who will represent the system manufacturer), the mechanical subcontractors and other entities affected by construction activities of this section.
- Notify Architect four calendar days in advance of scheduled meeting date.

DELIVERY, STORAGE, AND HANDLING

Deliver materials to the project site clearly marked for proper identification.

Receive, handle and store materials in conformance with the manufacturers printed instructions.

Store products under cover, in manufacturer's unopened packaging until ready for installation.

Protect materials from exposure to moisture.

Store materials in a dry, warm, ventilated weathertight location.

Protect metal fabrications from damage by exposure to weather.

Handling: Use a forklift or crane to move material. Do not lift the bundles by the metal bands.

Fork Lift: Spread the forks as far as possible to balance the load. Drive slowly when moving long bundles over uneven surfaces to avoid tipping the load

Crane: Position the canvas sling straps so that the space between the straps is at least 1/3 the length of the bundle. Use sling straps with looped ends running one end of the strap through the loop at the other end to cinch the bundle when lifted. When setting the load on the roof, put wood blocks under it to protect the roof and allow space to remove the sling straps.

Roof Placement: Spread the bundles and crates out as much as possible to avoid overloading the roof structure. Place the material directly over major supports such as beams or trusses.

Position bundles of tubing parallel to the slope of the roof and block prior to opening to prevent the tubing from rolling down the roof slope when unbundled.

PROJECT CONDITIONS

Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

Field Measurements: Verify roof screen dimensions and conditions of the installation by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating equipment enclosure without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

WARRANTY

Framing System: Provide manufacturer's standard written limited warranty stating that the complete framing system shall be warranted against structural failure due to cracking, buckling, bending, tearing or corrosion arising under normal use and environmental conditions for the coverage period applicable.

Products installed on projects located 2 miles or greater from salt or brackish bodies of water shall be warranted for twenty (20) years

Products installed on projects located greater than 1 mile but less than 2 miles from salt or

brackish bodies of water will be warranted for five (5) years, except for aluminum, stainless steel or copper Products which will be warranted for twenty (20) years.

Products installed on projects located 1 mile or less from salt or brackish bodies of water will be warranted for three (3) years, except for aluminum, stainless steel or copper Products which will be warranted for twenty (20) years

Panel Finish:

Provide written warranty stating that the paint finish applied on all equipment enclosure panels will be warranted against chipping, peeling, cracking, fading, or blistering for the coverage period of twenty (20) years.

Provide warranty signed by the panel manufacturer and paint finish applicator (if separate from manufacturer).

Louvers: Refer to Section 089100, Louvers

The above warranties are in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS

Design Loads: Comply with Building Code for site location and building height.

Design to resist ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

Design all materials, assembly and attachments to resist snow, wind, suction and uplift loading at any point without damage or permanent set.

Structural Design: Prepare structural design calculations for screen framing and attachment to structure including reactions at base supports for verification of roof structure by Architect.

All welds to be performed by an AWS certified welder. Valid certification to be provided.

MANUFACTURERS

Acceptable Manufacturer: RoofScreen Mfg., which is located at: 347 Coral St. ; Santa Cruz, CA 95060; Toll Free Tel: 866-766-3727; Tel: 831-421-9230; Fax: 866-253-0738; Email: request info (info@roofscreen.com); Web: www.roofscreen.com.

Requests for substitutions will be considered in accordance with provisions of Section [012500, Substitutions Procedures][016000, Product Requirements and Substitutions].

MATERIALS

Square Base Supports: Weldments fabricated from cold rolled steel conforming to ASTM A 1008, fabricated with pre-punched holes in base plate for fastening to roof structure. After fabrication, apply minimum 2 to 4 mil baked on powder coat primer.

Height 12 inches (305 mm).

Square Base Support Extensions: Fabricated from same material and finish as base supports.

Height 4 inches (101 mm).

Square Base Cap: Weldments fabricated from AISI Type 304 stainless steel with mill finish, and

fabricated to overlap base support and flashing boot a minimum of 2 inches (51 mm). Provide moment resisting adjustable connection to attach framing to base cap.

Square PVC Roof Flashing: Fabricated from 60 mil, white, single ply PVC sheet conforming to ASTM D 4434. Provide with base flange that extends a minimum of 5 inches (127 mm) onto the roof surface on all four sides. Riser shall be tapered to allow easy fit over Square Base Supports with minimal gap at top of flashing. Hot weld all seams for water tightness.

Roof Flashing: Refer to Division 07 section that specifies the roof membrane.

Base Cap Gasket: EPDM with self-adhesive closed cell foam.

Framing: Carbon steel structural tubing in manufacturer's standard sizes, conforming to ASTM A 500 with manufacturer's standard galvanized coating conforming to ASTM B 117 salt spray testing. Provide with wall thickness as determined by structural calculations.

Connector Fittings: Fabricated from AISI Type 304 stainless steel with mill finish.

Steel Hat Channel: Steel sheet conforming to ASTM A 653, Class SS, with a G90 hot-dip galvanized coating.

Hardware: Bolts, nuts, washers and screws 18-8 stainless steel.

Welding Materials: AWS D1.1; type required for materials being welded.

Panel:

- Profile:
  - Flush Panel.
- Base Metal:
  - Minimum 24 gauge Galvalume steel sheet, AZ50, conforming to ASTM A 792 for painted and unpainted panels.
- Finish:
  - PVDF fluoropolymer, 1 mil, 2 coat, 70 percent.
  - Color as selected by Architect from manufacturer's standard color range, 20 colors minimum.
  - Coat reverse side with off-white primer coat.
- Panel Fasteners: No. 14 self-tapping sheet metal screw. Color coat heads to match panel color.
- Panel Trim: Same material and finish as panel. Configuration as shown on Drawings

FABRICATION

Fit and shop assemble items in largest practical sections, for delivery to site.

Fabricate items with joints tightly fitted and secured.

Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

Fabricate system components so that portions of screen can be dismantled for repairs to equipment being screened and for future roof replacement.

Trim and Closures: Fabricated from 24 gauge metal and finished with the manufacturer's standard coating system.

PART 3 - EXECUTION

EXAMINATION

Examine area where work will be installed to verify the installation can be performed in accordance with the Drawings and structural calculation requirements without interference from other equipment or trades.

If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

Do not begin installation until conditions have been properly prepared.

PREPARATION

Clean surfaces thoroughly prior to installation.

Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

INSTALLATION

Install in accordance with manufacturer's instructions.

Install components plumb and level, accurately fitted, free from distortion or defects.

Provide for erection loads, and for sufficient temporary bracing to maintain indicated alignment until completion of erection and installation of permanent attachments.

Anchor fabrications to structure as indicated.

Separate dissimilar metals and use gasketed fasteners, isolation shim, or isolation tape to eliminate possibility of corrosive or electrolytic action between metals.

Exercise care when installing components so as not to damage finish surfaces. Touch up as required to repair damaged finishes.

Install flashing boots at base supports as required to provide a watertight connection. Install as recommended by the roof membrane manufacturer.

Remove all protective masking from material immediately after installation.

CLEANING AND PROTECTION

Remove all protective masking from framing and trim material immediately after installation. Remove temporary protective coverings and strippable films, if any, as metal wall panels are installed, unless otherwise indicated in manufacturer's written installation instructions. Maintain in a clean condition during construction.

Protect installed products until completion of project.

Ensure that finishes and structure of installed systems are not damaged by subsequent

construction activities.

If minor damage to finishes occurs, repair damage in accordance with manufacturer's recommendations; provide replacement components if repaired finishes are unacceptable to Architect.

Prior to Substantial Completion: Remove dust or other foreign matter from component surfaces; clean finishes in accordance with manufacturer's instructions.

Replace metal wall panels and framing members that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

Page Intentionally Left Blank

SECTION 12 36 61.16
SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

SUMMARY
Section Includes:
Solid surface material countertops.
Solid surface material backsplashes.
Solid surface material end splashes.
Solid surface material apron fronts.

ACTION SUBMITTALS
Product Data: For countertop materials[**and sinks**].

Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

Samples: For each type of material exposed to view.

PART 2 - PRODUCTS

SOLID SURFACE COUNTERTOP MATERIALS
Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.

Type: Provide Standard type unless Special Purpose type is indicated.
Integral Sink Bowls: Comply with CSA B45.5/IAPMO Z124.
Colors and Patterns: As selected by Architect from manufacturer's full range.

COUNTERTOP FABRICATION
Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."

Grade: Custom.

Configuration:

Front: Straight, slightly eased at top.
Backsplash: Straight, slightly eased at corner.
End Splash: Matching backsplash.

Countertops: 1/2-inch- thick, solid surface material with front edge built up with same material.

Backsplashes: 1/2-inch- thick, solid surface material.

Joints: Fabricate countertops without joints.

Joints: Fabricate countertops in sections for joining in field.

Cutouts and Holes:

Undercounter Plumbing Fixtures: Make cutouts for fixtures using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.

INSTALLATION MATERIALS

Adhesive: Product recommended by solid surface material manufacturer.

Sealant for Countertops: Comply with applicable requirements in Section 07 92 00 "Joint Sealants."

PART 3 - EXECUTION

INSTALLATION

Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer.

Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.

Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions.

Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.

Install backsplashes and end splashes by adhering to wall and countertops with adhesive.

Install aprons to backing and countertops with adhesive.

Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

Apply sealant to gaps at walls; comply with Section 07 92 00 "Joint Sealants."

END OF SECTION

SECTION 31 10 00
SITE CLEARING

PART 1 - GENERAL

SUMMARY

Section Includes:

- Protecting existing vegetation to remain.
- Removing existing vegetation.
- Clearing and grubbing.
- Stripping and stockpiling topsoil.
- Removing above- and below-grade site improvements.
- Disconnecting, capping, or sealing site utilities.
- Temporary erosion and sedimentation control.

PREINSTALLATION MEETINGS

Preinstallation Conference: Conduct conference at Project site.

MATERIAL OWNERSHIP

Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

FIELD CONDITIONS

Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

- Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
- Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.

Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place.

PART 2 - PRODUCTS

MATERIALS

Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 31 20 00 "Earth Moving."

- Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

PREPARATION

Protect and maintain benchmarks and survey control points from disturbance during construction.

Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed.

Protect existing site improvements to remain from damage during construction.

- Restore damaged improvements to their original condition, as acceptable to Owner.

TEMPORARY EROSION AND SEDIMENTATION CONTROL

Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

TREE AND PLANT PROTECTION

Protect trees and plants remaining on-site.

Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction.

EXISTING UTILITIES

Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

Arrange with utility companies to shut off indicated utilities.

Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

Notify Architect not less than two days in advance of proposed utility interruptions.
Do not proceed with utility interruptions without Architect's written permission.

Removal of underground utilities is included in earthwork sections; in applicable fire suppression, plumbing, HVAC, electrical, communications, electronic safety and security, and utilities sections.

CLEARING AND GRUBBING

Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

Grind down stumps and remove roots larger than 3 inches in diameter, obstructions, and debris to a depth of 18 inches below exposed subgrade.
Use only hand methods or air spade for grubbing within protection zones.

Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

TOPSOIL STRIPPING

Remove sod and grass before stripping topsoil.

Strip topsoil to depth of 6 inches in a manner to prevent intermingling with underlying subsoil or other waste materials.

Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

SITE IMPROVEMENTS

Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

DISPOSAL OF SURPLUS AND WASTE MATERIALS

Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION

Page Intentionally Left Blank

SECTION 31 20 00
EARTH MOVING

PART 1 - GENERAL

SUMMARY

Section Includes:

- Excavating and filling for rough grading the Site.
- Preparing subgrades for slabs-on-grade, pavements, turf and grasses and plants.
- Excavating and backfilling for buildings and structures.
- Drainage course for concrete slabs-on-grade.
- Subbase course for concrete pavements.
- Subbase course and base course for asphalt paving.
- Excavating and backfilling trenches for utilities and pits for buried utility structures.

DEFINITIONS

Backfill: Soil material used to fill an excavation.

- Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
- Final Backfill: Backfill placed over initial backfill to fill a trench.

Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

- Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

Fill: Soil materials used to raise existing grades.

Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

PREINSTALLATION MEETINGS
Preinstallation Conference: Conduct preexcavation conference at Project site.

INFORMATIONAL SUBMITTALS
Material test reports.

FIELD CONDITIONS
Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth-moving operations.

Do not commence earth-moving operations until plant-protection measures specified in Section 01 56 39 "Temporary Tree and Plant Protection" are in place.

PART 2 - PRODUCTS

SOIL MATERIALS
General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487 Groups A-1, A-2-4, A-2-5, and A-3 according to AASHTO M 145, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487 Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.

Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 294/D 2940M 0; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

Drainage Course: Narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and zero to 5 percent passing a No. 8 sieve.

ACCESSORIES
Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored to comply with local practice or requirements of authorities having jurisdiction.

Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored to comply with local practice or requirements of authorities having jurisdiction.

PART 3 - EXECUTION

PREPARATION

Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

Protect and maintain erosion and sedimentation controls during earth-moving operations.

Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

EXCAVATION, GENERAL

Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

EXCAVATION FOR STRUCTURES

Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

Pile Foundations: Stop excavations 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.

Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

Excavations at Edges of Tree- and Plant-Protection Zones:

Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

Cut and protect roots according to requirements in Section 01 56 39 "Temporary Tree and Plant Protection."

EXCAVATION FOR WALKS AND PAVEMENTS

Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

EXCAVATION FOR UTILITY TRENCHES

Excavate trenches to indicated gradients, lines, depths, and elevations.

Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

Clearance: 12 inches each side of pipe or conduit.

Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

Trenches in Tree- and Plant-Protection Zones:

Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.

Cut and protect roots.

SUBGRADE INSPECTION

Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired dump truck to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

UNAUTHORIZED EXCAVATION

Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.

Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

STORAGE OF SOIL MATERIALS

Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

UTILITY TRENCH BACKFILL

Place backfill on subgrades free of mud, frost, snow, or ice.

Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Section 03 30 00 "Cast-in-Place Concrete."

Trenches under Roadways: Provide 4-inch- thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a

minimum of 4 inches of concrete before backfilling or placing roadway subbase course. Concrete is specified in Section 03 30 00 "Cast-in-Place Concrete."

Initial Backfill: Place and compact initial backfill of subbase material satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

Final Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.

Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

SOIL FILL

Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

Place and compact fill material in layers to required elevations as follows:

Under grass and planted areas, use satisfactory soil material.
Under walks and pavements, use satisfactory soil material.
Under steps and ramps, use engineered fill.
Under building slabs, use engineered fill.
Under footings and foundations, use engineered fill.

SOIL MOISTURE CONTROL

Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

COMPACTION OF SOIL BACKFILLS AND FILLS

Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698 ASTM D 1557:

Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

GRADING

General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

Turf or Unpaved Areas: Plus or minus 1 inch.
Walks: Plus or minus 1 inch.
Pavements: Plus or minus 1/2 inch.

Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

Place subbase course and base course on subgrades free of mud, frost, snow, or ice.

On prepared subgrade, place subbase course and base course under pavements and walks as follows:

Shape subbase course and base course to required crown elevations and cross-slope grades.
Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698 ASTM D 1557.

DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

Place drainage course on subgrades free of mud, frost, snow, or ice.

On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

FIELD QUALITY CONTROL

Special Inspections: Owner will engage a qualified special inspector to perform inspections:

Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

PROTECTION

Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

DISPOSAL OF SURPLUS AND WASTE MATERIALS

Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION

Page Intentionally Left Blank

SECTION 32 12 16
ASPHALT PAVING

PART 1 - GENERAL

SUMMARY
Section Includes:
Hot-mix asphalt paving.

PREINSTALLATION MEETINGS
Preinstallation Conference: Conduct conference at Project site.

ACTION SUBMITTALS
Product Data: For each type of product.

INFORMATIONAL SUBMITTALS
Material Certificates: For each paving material. Include statement that mixes containing recycled materials will perform equal to mixes produced from all new materials.

QUALITY ASSURANCE
Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the DOT of state in which Project is located.

Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of of WI DOT for asphalt paving work.

Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

PART 2 - PRODUCTS

AGGREGATES
Coarse Aggregate: ASTM D 692/D 692M, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.

Fine Aggregate: ASTM D 1073, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.

Mineral Filler: ASTM D 242/D 242M, rock or slag dust, hydraulic cement, or other inert material.

ASPHALT MATERIALS
Asphalt Binder: AASHTO M 320, PG 64-22.

Tack Coat: ASTM D 977 emulsified asphalt, or ASTM D 2397 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

AUXILIARY MATERIALS
Recycled Materials for Hot-Mix Asphalt Mixes: Reclaimed asphalt pavement; reclaimed, unbound-aggregate base material; and recycled tires, asphalt shingles, or glass from sources and gradations that have performed satisfactorily in previous installations, equal to performance of required hot-mix asphalt paving produced from all new materials.

Herbicide: Commercial chemical for weed control, registered by the EPA, and not classified as "restricted use" for locations and conditions of application. Provide in granular, liquid, or wettable powder form.

MIXES

Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and complying with the following requirements:

Provide mixes with a history of satisfactory performance in geographical area where Project is located.

PART 3 - EXECUTION

SURFACE PREPARATION

General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.

Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd..

Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.

Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

PLACING HOT-MIX ASPHALT

Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

Spread mix at a minimum temperature of 250 deg F.

Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

JOINTS

Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

Clean contact surfaces and apply tack coat to joints.

Offset longitudinal joints, in successive courses, a minimum of 6 inches.

Offset transverse joints, in successive courses, a minimum of 24 inches.

Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."

COMPACTION

General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

Complete compaction before mix temperature cools to 185 deg F.

Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent or greater than 96 percent.

Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

ASPHALT CURBS

Construct hot-mix asphalt curbs over compacted pavement surfaces. Apply a light tack coat unless pavement surface is still tacky and free from dust. Spread mix at a minimum temperature of 250 deg F.

Asphalt Mix: Same as pavement surface-course mix.

Place hot-mix asphalt to curb cross section indicated or, if not indicated, to local standard shapes, by machine or by hand in wood or metal forms. Tamp hand-placed materials and screed to smooth finish. Remove forms after hot-mix asphalt has cooled.

INSTALLATION TOLERANCES

Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

Base Course: Plus or minus 1/2 inch.
Surface Course: Plus 1/4 inch, no minus.

Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

Base Course: 1/4 inch.
Surface Course: 1/8 inch.
Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

FIELD QUALITY CONTROL

Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

Replace and compact hot-mix asphalt where core tests were taken.

Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

WASTE HANDLING

General: Handle asphalt-paving waste according to approved waste management plan required in Section 01 74 19 "Construction Waste Management and Disposal."

END OF SECTION

SECTION 32 13 73
CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

SUMMARY
Section Includes:
- Cold-applied joint sealants.
- Hot-applied joint sealants.
- Joint-sealant backer materials.
- Primers.

ACTION SUBMITTALS
Product Data: For each type of product.

Samples: For each kind and color of joint sealant required.

Paving-Joint-Sealant Schedule: Include the following information:

- Joint-sealant application, joint location, and designation.
- Joint-sealant manufacturer and product name.
- Joint-sealant formulation.
- Joint-sealant color.

INFORMATIONAL SUBMITTALS
Product certificates.

PART 2 - PRODUCTS

MATERIALS, GENERAL
Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

COLD-APPLIED JOINT SEALANTS
Single-Component, Nonsag, Silicone Joint Sealant: ASTM D 5893/D 5893M, Type NS.

Single-Component, Self-Leveling, Silicone Joint Sealant: ASTM D 5893/D 5893M, Type SL.

Multicomponent, Nonsag, Urethane, Elastomeric Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use T.

Single Component, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Use T.

Multicomponent, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C 920, Type M, Grade P, Class 25, for Use T.

HOT-APPLIED JOINT SEALANTS
Hot-Applied, Single-Component Joint Sealant: ASTM D 6690, Type I.

Hot-Applied, Single-Component Joint Sealant: ASTM D 6690, Type I or Type II.

Hot-Applied, Single-Component Joint Sealant: ASTM D 6690, Type I, II, or III.

Hot-Applied, Single-Component Joint Sealant: ASTM D 6690, Type IV.

JOINT-SEALANT BACKER MATERIALS

Round Backer Rods for Cold- and Hot-Applied Joint Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

Round Backer Rods for Cold-Applied Joint Sealants: ASTM D 5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of sealant.

Backer Strips for Cold- and Hot-Applied Joint Sealants: ASTM D 5249; Type 2; of thickness and width required to control joint-sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

PRIMERS

Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated.

PART 3 - EXECUTION

INSTALLATION OF JOINT SEALANTS

Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

Cleaning of Joints: Clean out joints immediately to comply with joint-sealant manufacturer's written instructions.

Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer.

Joint-Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions.

Install joint-sealant backings to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

- Do not leave gaps between ends of joint-sealant backings.
- Do not stretch, twist, puncture, or tear joint-sealant backings.
- Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.

Install joint sealants immediately following backing installation, using proven techniques that comply with the following:

- Place joint sealants so they fully contact joint substrates.
- Completely fill recesses in each joint configuration.
- Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants according to the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:

- Remove excess joint sealant from surfaces adjacent to joints.

Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

Clean off excess joint sealant as the Work progresses, by methods and with cleaning materials approved in writing by joint-sealant manufacturers.

END OF SECTION

Page Intentionally Left Blank

SECTION 32 91 13
SOIL PREPARATION

PART 1 - GENERAL

SUMMARY
Section includes planting soils specified by composition of the mixes.

DEFINITIONS
Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.

Imported Soil: Soil that is transported to Project site for use.

Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.

Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.

USCC: U.S. Composting Council.

PREINSTALLATION MEETINGS
Preinstallation Conference: Conduct conference at Project site.

ACTION SUBMITTALS
Product Data: For each type of product.

Samples: For each bulk-supplied material in sealed containers labeled with content, source, and date obtained; providing an accurate representation of composition, color, and texture.

INFORMATIONAL SUBMITTALS
Field quality-control reports.

QUALITY ASSURANCE
Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.

PART 2 - PRODUCTS

PLANTING SOILS SPECIFIED BY COMPOSITION
Planting-Soil Type Insert drawing designation: Imported, naturally formed soil from off-site sources and consisting of soil according to USDA textures; and modified to produce viable planting soil.

Sources: Take imported, unamended soil from sources that are naturally well-drained sites where topsoil occurs at least 4 inches deep, not frombogs, or marshes; and that do not contain undesirable organisms; disease-causing plant pathogens; or obnoxious weeds and invasive plants including, but not limited to, quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and bromegrass.

Additional Properties of Imported Soil before Amending: Soil reaction of pH 6 to 7 and minimum of 4 percent organic-matter content, friable, and with sufficient structure to give good tilth and aeration.

Unacceptable Properties: Clean soil of the following:

Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.

Unsuitable Materials: Stones, roots, plants, sod, clay lumps, and pockets of coarse sand that exceed a combined maximum of 8 percent by dry weight of the imported soil.

Large Materials: Stones, clods, roots, clay lumps, and pockets of coarse sand exceeding 3 inches in any dimension.

FERTILIZERS

Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.

Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.

Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.

Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.

PART 3 - EXECUTION

GENERAL

Place planting soil and fertilizers according to requirements in other Specification Sections.

Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.

PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING

Excavation: Excavate soil from designated area(s) to a depth of 6 inches and stockpile until amended.

Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.

Unsuitable Materials: Clean soil to contain a maximum of 8 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.

Screening: Pass unamended soil through a 3-inch sieve to remove large materials.

FIELD QUALITY CONTROL

Testing Agency: Engage a qualified testing agency to perform tests and inspections.

Perform the following tests and inspections:

Compaction: Test planting-soil compaction after placing each lift and at completion using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D 698. Space tests at no less than one for each 2000 sq. ft. of in-place soil or part thereof.

Soil will be considered defective if it does not pass tests and inspections.

Prepare test and inspection reports.

Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.

PROTECTION AND CLEANING

Protection Zone: Identify protection zones according to Section 01 56 39 "Temporary Tree and Plant Protection."

Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:

Storage of construction materials, debris, or excavated material.
Parking vehicles or equipment.
Vehicle traffic.
Foot traffic.
Erection of sheds or structures.
Impoundment of water.
Excavation or other digging unless otherwise indicated.

Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.

Dispose of excess subsoil and unsuitable materials on-site where directed by Owner.

END OF SECTION

Page Intentionally Left Blank

SECTION 32 92 00
TURF AND GRASSES

PART 1 - GENERAL

SUMMARY
Section Includes:
Seeding.
Sodding.

DEFINITIONS
Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 32 91 13 "Soil Preparation" and drawing designations for planting soils.

PREINSTALLATION MEETINGS
Preinstallation Conference: Conduct conference at Project site.

INFORMATIONAL SUBMITTALS
Certification of grass seed.

Certification of each seed mixture for turfgrass sod.

Product certificates.

QUALITY ASSURANCE
Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment.

Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:

Landscape Industry Certified Technician - Exterior.
Landscape Industry Certified Lawncare Manager.
Landscape Industry Certified Lawncare Technician.

Pesticide Applicator: State licensed, commercial.

DELIVERY, STORAGE, AND HANDLING
Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.

Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" sections in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod within 24 hours of harvesting and in time for planting promptly. Protect sod from breakage and drying.

PART 2 - PRODUCTS

SEED

Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Rules for Testing Seeds" for purity and germination tolerances.

Seed Species:

Quality: State-certified seed of grass species as listed below for solar exposure.

Quality: Seed of grass species as listed below for solar exposure, with not less than 85 percent germination, not less than 95 percent pure seed, and not more than 0.5 percent weed seed:

TURFGRASS SOD

Turfgrass Sod: Approved Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture that is strongly rooted and capable of vigorous growth and development when planted.

FERTILIZERS

Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.

Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.

MULCHES

Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

Sphagnum Peat Mulch: Partially decomposed sphagnum peat moss, finely divided or of granular texture, and with a pH range of 3.4 to 4.8.

Muck Peat Mulch: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent, and containing no sand.

Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

PESTICIDES

General: Pesticide, registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

PART 3 - EXECUTION

TURF AREA PREPARATION

General: Prepare planting area for soil placement and mix planting soil according to Section 32 91 13 "Soil Preparation."

Reduce elevation of planting soil to allow for soil thickness of sod.

Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

SEEDING

Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph.

Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.

Do not use wet seed or seed that is moldy or otherwise damaged.

Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

Sow seed at a total rate of 3 to 4 lb/1000 sq. ft..

Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas.

Anchor straw mulch by crimping into soil with suitable mechanical equipment.

SODDING

Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to soil or sod during installation. Tamp and roll lightly to ensure contact with soil, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

Lay sod across slopes exceeding 1:3.

Anchor sod on slopes exceeding 1:6 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than two anchors per sod strip to prevent slippage.

Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

TURF MAINTENANCE

General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings.

SATISFACTORY TURF

Turf installations shall meet the following criteria as determined by Architect:

Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.

Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.

Use specified materials to reestablish turf that does not comply with requirements, and continue maintenance until turf is satisfactory.

END OF SECTION

SECTION 33 41 00
STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

SUMMARY
Section Includes:
- Pipe and fittings.
- Channel drainage systems.
- Encasement for piping.
- Manholes.
- Cleanouts.
- Nonpressure transition couplings.
- Expansion joints.
- Catch basins.
- Stormwater inlets.
- Pipe outlets.

ACTION SUBMITTALS
Product Data: For each type of product indicated.

Shop Drawings:

Catch basins and stormwater inlets. Include plans, elevations, sections, details, frames, covers, and grates.

INFORMATIONAL SUBMITTALS
Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

Profile Drawings: Show system piping in elevation. Draw profiles at horizontal scale of not less than 1 inch equals 50 feet and vertical scale of not less than 1 inch equals 5 feet. Indicate manholes and piping. Show types, sizes, materials, and elevations of other utilities crossing system piping.

Product Certificates: For each type of cast-iron soil pipe and fitting, from manufacturer.

Field quality-control reports.

PROJECT CONDITIONS
Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

Notify Architect and Owner no fewer than two days in advance of proposed interruption of service.

PART 2 - PRODUCTS

PVC PIPE AND FITTINGS
PVC Corrugated Sewer Piping:

Pipe: ASTM F 949, PVC, corrugated pipe with bell-and-spigot ends for gasketed joints.
Fittings: ASTM F 949, PVC molded or fabricated, socket type.
Gaskets: ASTM F 477, elastomeric seals.

NONPRESSURE TRANSITION COUPLINGS

Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.

Sleeve Materials:

For Concrete Pipes: ASTM C 443, rubber.
For Cast-Iron Soil Pipes: ASTM C 564, rubber.
For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

Unshielded, Flexible Couplings:

Description: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.

Shielded, Flexible Couplings:

Description: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

Ring-Type, Flexible Couplings:

Description: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.

EXPANSION JOINTS

Ductile-Iron Flexible Expansion Joints:

Description: Compound fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Include two gasketed ball-joint sections and one or more gasketed sleeve sections, rated for 250-psig minimum working pressure and for offset and expansion indicated.

CLEANOUTS

Plastic Cleanouts:

Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

ENCASEMENT FOR PIPING

Standard: ASTM A 674 or AWWA C105.

Material: Linear low-density polyethylene film of 0.008-inch or high-density, cross-laminated polyethylene film of 0.004-inch minimum thickness.

Form: Sheet or tube.

Color: Black or natural.

CATCH BASINS

Standard Precast Concrete Catch Basins:

Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
Riser Sections: 4-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.
Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
Joint Sealant: ASTM C 990, bitumen or butyl rubber.
Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.
Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch-diameter frame and grate.
Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, structural loading. Include flat grate with small square or short-slotted drainage openings.

Size: 24 by 24 inches minimum unless otherwise indicated.
Grate Free Area: Approximately 50 percent unless otherwise indicated.

Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, structural loading. Include 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch-diameter flat grate with small square or short-slotted drainage openings.

Grate Free Area: Approximately 50 percent unless otherwise indicated.

PART 3 - EXECUTION

EARTHWORK

Excavation, trenching, and backfilling are specified in Section 31 20 00 "Earth Moving."

PIPING INSTALLATION

General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.

Install gravity-flow, nonpressure drainage piping according to the following:

Install piping pitched down in direction of flow.
Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors.
Install piping with 48-inch minimum cover.

Install hub-and-spigot, cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook."
Install hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook."
Install ductile-iron piping and special fittings according to AWWA C600 or AWWA M41.
Install PE corrugated sewer piping according to ASTM D 2321.
Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.
Install nonreinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."
Install reinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."

Install corrosion-protection piping encasement over the following underground metal piping according to ASTM A 674 or AWWA C105:

Hub-and-spigot, cast-iron soil pipe and fittings.
Hubless cast-iron soil pipe and fittings.
Ductile-iron pipe and fittings.
Expansion joints.

PIPE JOINT CONSTRUCTION

Join gravity-flow, nonpressure drainage piping according to the following:

Join hub-and-spigot, cast-iron soil piping with gasketed joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.
Join hubless cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-coupling joints.
Join ductile-iron culvert piping according to AWWA C600 for push-on joints.
Join ductile-iron piping and special fittings according to AWWA C600 or AWWA M41.
Join corrugated PE piping according to ASTM D 3212 for push-on joints.
Join PVC corrugated sewer piping according to ASTM D 2321 for elastomeric-seal joints.
Join nonreinforced-concrete sewer piping according to ASTM C 14 and ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
Join dissimilar pipe materials with nonpressure-type flexible couplings.

CLEANOUT INSTALLATION

Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.

Use Light-Duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
Use Medium-Duty, top-loading classification cleanouts in paved foot-traffic areas.
Use Heavy-Duty, top-loading classification cleanouts in vehicle-traffic service areas.
Use Extra-Heavy-Duty, top-loading classification cleanouts in roads.

Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding earth grade.

Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

CATCH BASIN INSTALLATION

Set frames and grates to elevations indicated.

CONCRETE PLACEMENT
Place cast-in-place concrete according to ACI 318.

CHANNEL DRAINAGE SYSTEM INSTALLATION
Install with top surfaces of components, except piping, flush with finished surface.

Assemble channel sections to form slope down toward drain outlets. Use sealants, adhesives, fasteners, and other materials recommended by system manufacturer.

Embed channel sections and drainage specialties in 4-inch minimum concrete around bottom and sides.

Fasten grates to channel sections if indicated.

Assemble channel sections with flanged or interlocking joints.

Embed channel sections in 4-inch minimum concrete around bottom and sides.

CONNECTIONS
Connect nonpressure, gravity-flow drainage piping in building's storm building drains specified in Section 22 14 13 "Facility Storm Drainage Piping."

Make connections to existing piping and underground manholes.

Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.

Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.

Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.

Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.

Use epoxy-bonding compound as interface between new and existing concrete and piping materials.

Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

Connect to sediment interceptors specified in Section 22 13 23 "Sanitary Waste Interceptors."

Pipe couplings and expansion joints with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping unless otherwise indicated.

Shielded flexible couplings for same or minor difference OD pipes.

Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.

Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

IDENTIFICATION

Materials and their installation are specified in Section 31 20 00 "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.

Use warning tape or detectable warning tape over ferrous piping.
Use detectable warning tape over nonferrous piping and over edges of underground structures.

FIELD QUALITY CONTROL

Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

Submit separate reports for each system inspection.
Defects requiring correction include the following:

Alignment: Less than full diameter of inside of pipe is visible between structures.
Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
Damage: Crushed, broken, cracked, or otherwise damaged piping.
Infiltration: Water leakage into piping.
Exfiltration: Water leakage from or around piping.

Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
Reinspect and repeat procedure until results are satisfactory.

Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

Do not enclose, cover, or put into service before inspection and approval.
Test completed piping systems according to requirements of authorities having jurisdiction.
Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
Submit separate report for each test.
Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:

Exception: Piping with soiltight joints unless required by authorities having jurisdiction.
Option: Test plastic piping according to ASTM F 1417.
Option: Test concrete piping according to ASTM C 924.

Leaks and loss in test pressure constitute defects that must be repaired.

Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

END OF SECTION